THE FOUNDRY

for APRIL 1947

VOLUME 75 NUMBER 4

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Sound Cores Are Many a

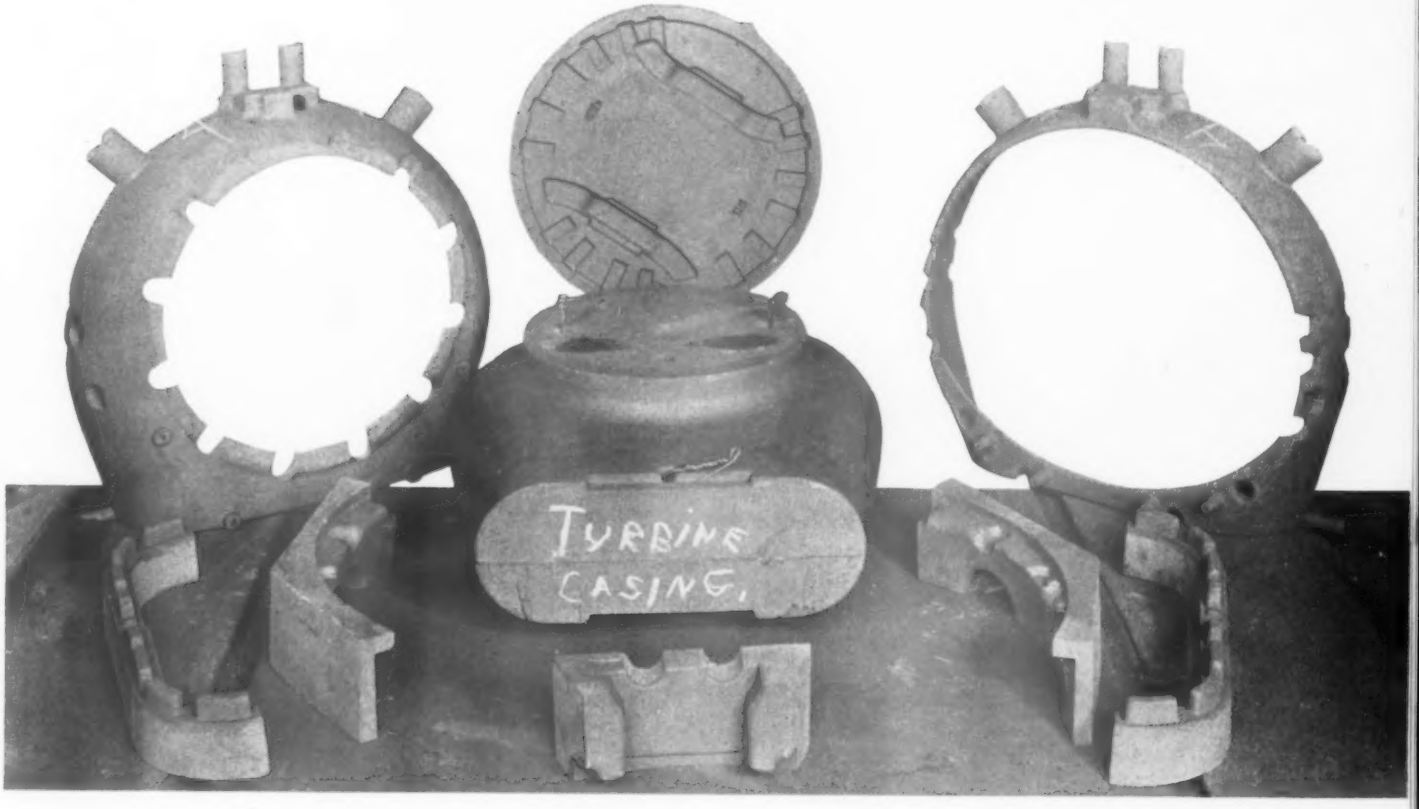
ELLIOTT COMPANY
Jeannette, Pa.

If making a profit is one of the objectives in making castings, you should investigate Linoil. There must be something worth while about it or it could hardly be the choice of so many capable foundrymen. Pete Evangeliste, superintendent at Elliott Company, does a pretty good core job with Linoil as the pictures show. What we recommend is that you buy a drum of Linoil and see what it will do for you. Check on Linoil's unusual binding power, check its behavior on bench and in blower, mark the oven time and the even through-to-center baking, compare your casting loss percentages, see how cleaning room time is reduced with Linoil cores. Linoil is moderately priced and a genuine profit maker.

LINOIL

the Basis of Successful Contract

Over a half-million gallons of Linoil are used each month by American foundries. There is your guarantee of uniformity, and more than a hint of superiority. Linoil is uniform, efficient and economical.



Set of cores for the turbine casing shown on opposite page. Casting weighs 325 pounds. Metal is Meehanite, half steel, and is poured at 2750—2800°F. Metal thickness is 5/16" to 1".

THE LINOIL THE LOGICAL OIL

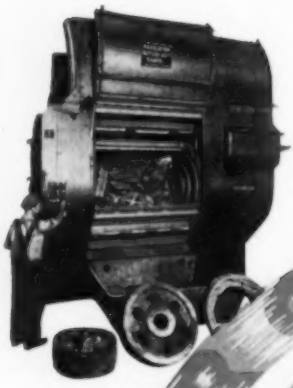
WERNER G. SMITH COMPANY

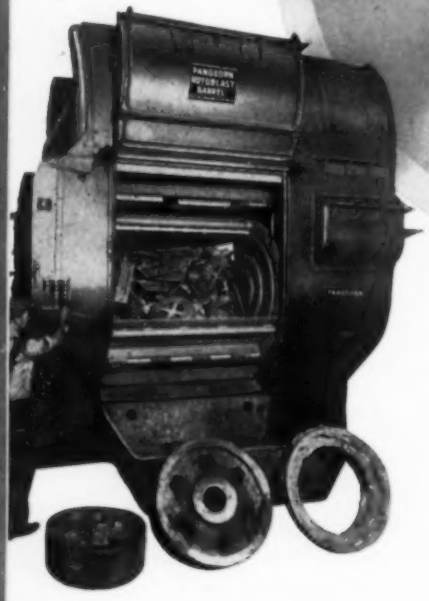
(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)

2191 WEST 110th STREET CLEVELAND 2, OHIO

Blasting Away

WITH ALL 3 BARRELS





SEND FOR
NEW ROTOBLAST UNIT
BULLETIN NO. 214

BLAST CLEANS CHEAPER WITH THE RIGHT EQUIPMENT FOR EVERY JOB

. . . TO LOWER THE COSTS OF CLEANING

Here's the history of a foundry that put itself in the ideal position to do quality work at costs pleasing to the customer and profitable to the foundry.

To meet the demands of the present and anticipate the problems of the future, Lynchburg Foundry Company revolutionized its methods — discarding old-fashioned "job shop" practices in favor of streamlined mass production *without sacrificing flexibility*.

First step was a mechanized molding unit — automatic wherever practical. But its higher output would have overloaded the tumbling mills then in service.

To match cleaning speed to molding speed, Lynchburg selected the Pangborn ROTOBLAST* Barrel — with twenty-five hundred to five thousand pounds capacity.

Output, Quality Up . . . Costs Down

Results justified the choice. Cleaning kept pace . . . breakage virtually vanished . . . finishing time per piece was cut to a fraction.

So — another ROTOBLAST Barrel was installed (and a Pangborn Air-blast Room for the larger pieces). Recently — a *third* ROTOBLAST Barrel was ordered.

Now? Blast-cleaning output averages 160 tons a day, with 200 tons not unusual. Lynchburg Foundry — with quality and costs in balance — faces the future with confidence!

For you — the ROTOBLAST method offers equally important advantages. Investigate ROTOBLAST — barrels, tables, special machines. Write Pangborn — *world's largest manufacturer of blast cleaning and dust control equipment.*

PANGBORN CORPORATION, 1300 Pangborn Boulevard, Hagerstown, Maryland

*Trademark of the Pangborn Corporation

Pangborn ROTOBLAST Cleaning Barrel shown at shake-out end of mechanized molding loop.

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

CHAMPIONS WELCOME CHALLENGES

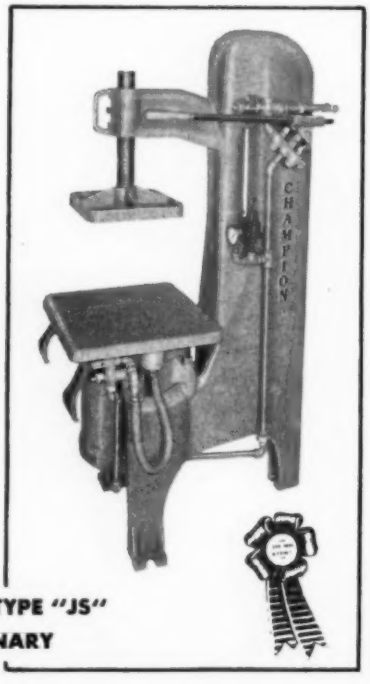
WHAT DOES INDUSTRY DEMAND OF MACHINERY IN THE POST-WAR PERIOD?

To meet the pressing need for greater production facing all industry today, foundries will gladly adopt machines and methods that have the proven capacity to make man-power more productive, improve quality and lower costs.

Champion Molding Machines and Core Blowers, true to their name, meet the challenge of our current situation by making it possible for less-skilled workers to turn out more and better molds and cores, thus reducing costs on a major operation in foundry work and by raising his productivity they broaden the opportunity for the worker.

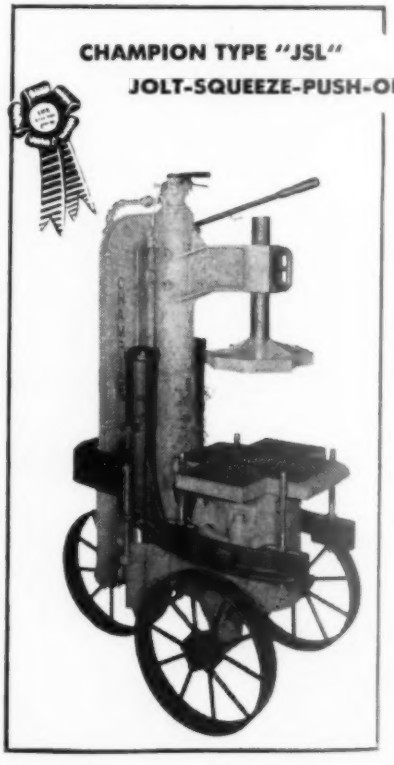
Each a *Champion*

CHAMPION TYPE "JS"
PORTABLE JOLT-SQUEEZER

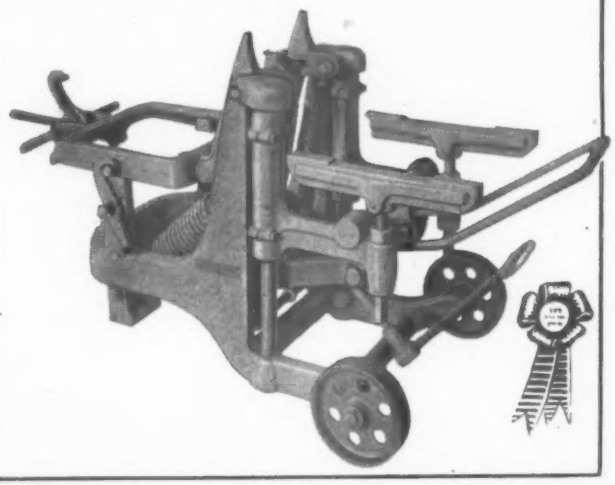


CHAMPION TYPE "JS"
STATIONARY

CHAMPION TYPE "JSL"
JOLT-SQUEEZE-PUSH-OFF



CHAMPION TYPE "W"
HAND RAM, ROLLOVER
AND DRAW MACHINE



CHAMPION TYPE "JM"
POWER JOLT, HAND ROLLOVER
AND DRAW MACHINE

in its CLASS!

CHAMPION MOLDING MACHINES MAKE CHAMPION MOLDERS!

Skilled workers prize good tools; unskilled workers *need* good tools! Champion Molding Machines enable the beginner to produce uniformly good molds quickly. The skilled operator finds his work easier, his production increased many times.

Furthermore, Champion Molding Machines are designed and constructed for long life and trouble-free operating, as demonstrated in leading foundries of the world today.

Tomorrow, when competition returns, you will be glad you invested in Champions!

CHAMPION FOUNDRY AND MACHINE CO.
1318 W. 21st STREET CHICAGO 8, ILLINOIS

A FAMOUS FOUNDRY

First THE MODERN, SCIENTIFIC SEACOAL REPLACEMENT

by DELTA PERMI-BOND

DELTA PERMI-BOND is a new and revolutionary development which eliminates the use of SEA COAL... and its inherent disadvantages... in molding sands.

DELTA PERMI-BOND is a specially prepared pure hydro-carbon, completely volatile at elevated temperatures. It decomposes to form a vapor-gas cushion, which is reducing in nature, and leaves only a trace (two/tenths of 1% maximum) of ash.

NOTE THESE IMPORTANT ADVANTAGES... and send for a liberal sample...

You will also receive complete information on "HOW TO USE DELTA PERMI-BOND".

1. Always uniform. Manufactured under rigid chemical and physical control.
2. Eliminates ash and free carbon which contaminate your sand.
3. Greatly reduces gas, smoke, soot and dirt in the foundry.
4. Provides correct amount of vapor gas in the mold cavity, which prevents casting blows and also allows use of lower permeability sand.
5. Increases dry strength of sand 75% to 90%.
6. Prevents scabbing, buckling, rat-tailing and cutting which greatly reduces scrap castings.
7. Improves casting finish, which cuts cleaning room costs to a minimum.
8. More economical to use; reduces your sand costs.
9. Much cleaner and more foolproof to use than sea coal.

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF FOUNDRY PRODUCTS, INDUSTRIAL AND AUTOMOTIVE OILS, GREASES AND COMPOUNDS

MILWAUKEE 9, WISCONSIN

NATIONAL SMELTING RESEARCH

Teams Up With Rigid Production Control In

TERNALLOY • ALLCAST • RED-X

ALUMINUM ALLOYS

The following aluminum alloys, outstanding achievements of National Smelting research, are produced under rigid technical control to insure uniformly high performance.

TERNALLOYS ... provide exceptionally high strength on natural aging; dimensional stability; excellent machinability; good corrosion resistance.

ALLCAST ... a high quality, general purpose casting alloy that provides superior mechanical properties.

RED-X ... for critical castings. Flexible composition permits adaptability to the particular casting requirement.

Write for illustrated booklets on these aluminum alloys—developments of National Smelting research... The National Smelting Co., 6706 Grant Ave., Cleveland 5, Ohio.

NATIONAL SMELTING

ENGINEERED TO

1. SAVE MONEY
2. REDUCE FATIGUE
3. SAVE TIME

EXPERT ENGINEERING of ROURA Self-Dumping HOPPERS gives maximum flexibility in materials handling. Efficient for any bulk material—hot, cold, wet or dry.

STURDY, ALL-WELDED CONSTRUCTION assures long, rugged use *without warping* . . . smooth seams mean clean, rapid dumping. Fits any standard type platform or fork lift truck.

OPERATING EASE saves time and effort . . . makes carrying and dumping safe. *One simple manual motion* releases hopper to automatically empty, return and lock . . . ready for the next load. EXPERIENCE RECORDS SHOW 50% CUT IN FATIGUE!!

Standard (1 cu. yd.) Model, $100.00 FOB Detroit.

Write for new detailed Bulletin.

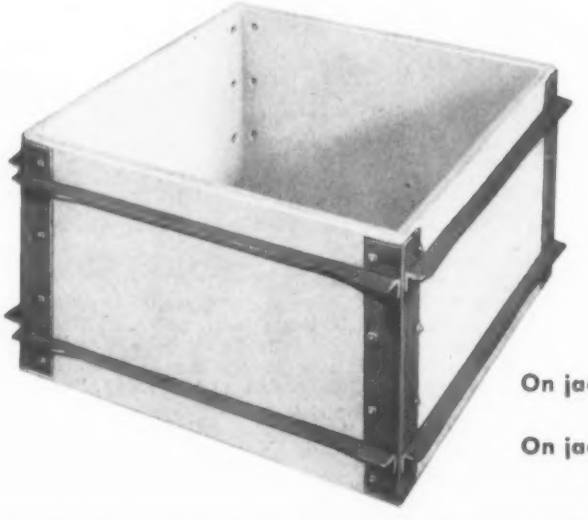
ROURA
SELF-DUMPING
HOPPERS

ROURA IRON WORKS

1405 WOODLAND AVENUE • DETROIT 11, MICHIGAN

MOLTEN METAL *CAN'T* HURT 'EM!

NON-BURN NON-WARP SLIP JACKETS



ARE NOT AFFECTED BY RUNOUTS or SPILL-OVERS

CMD Slip Jackets won't stick; they fit smoothly and strip *clean* from the mold.

Heavy corner irons 2" x 2" x ⅛" and cross reinforcing irons 1" x 1" x ⅛" bolted and arc-welded in place prevent warping.

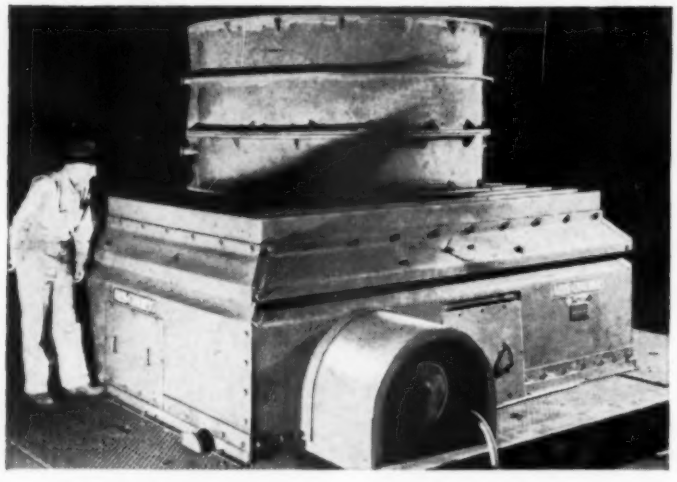
Write Today for Descriptive Circular!

On jackets up to 8" deep, SINGLE angle irons are used.
On jackets over 8" deep, DOUBLE angle irons are used.

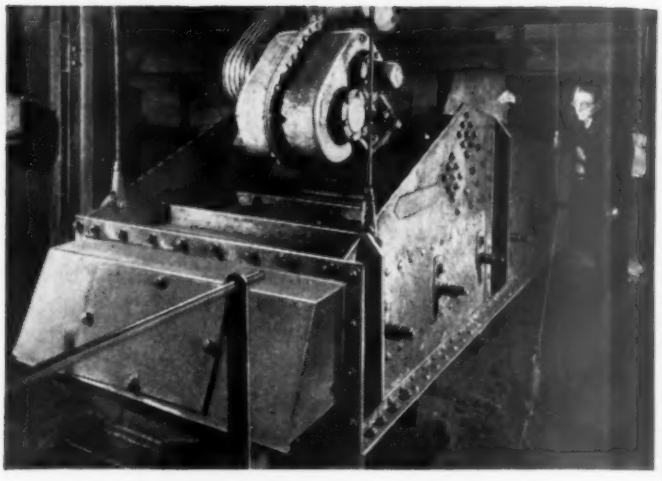
CHICAGO MANUFACTURING & DISTRIBUTING CO.

Dept. F, 1928 West 46th Street Chicago 9, Illinois

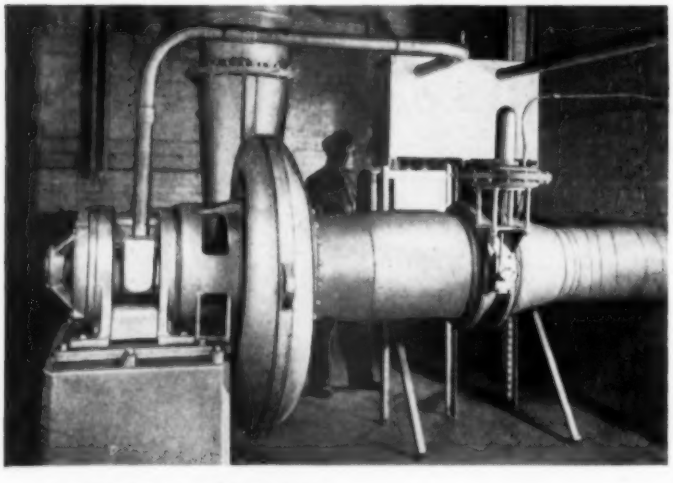
Mechanize



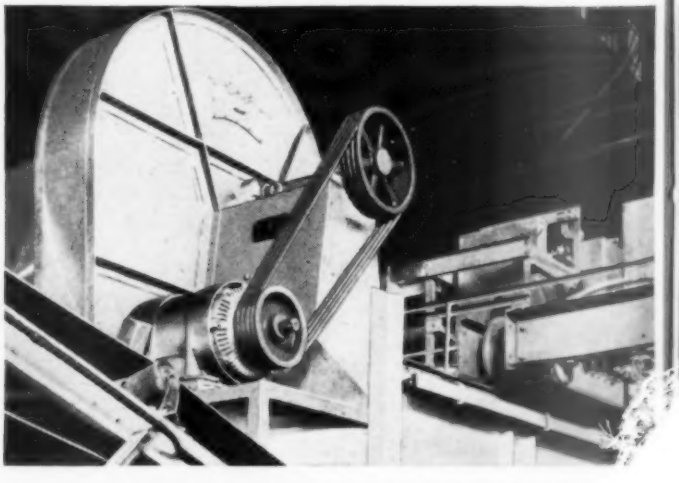
"FOUNDROMATIC" SHAKEOUTS These new, high speed units increase capacity over older, less efficient methods. They handle a wide range of flask sizes and shapes, and because load is evenly distributed over shakeout deck during operation, flask breakage is cut to a minimum. Offered in stationary and portable types in sizes from 4 ft x 6 ft to 8 ft x 10 ft. Capacities from 8,000 to 50,000 lbs. Series and parallel combinations for larger loads. Bulletin B6353.



VIBRATING SCREENS "Low-Head" screen above is one of four basic types Allis-Chalmers builds for foundries. Complete line includes inclined and horizontal designs for wet or dry screening, for aerating sand after mulling, for screening shakeout sand, for removal of refuse from new sand. Among outstanding features is high tensile strength steel alloy construction which gives up to 50% more strength . . . reduces overall weight . . . cuts power requirements.



CUPOLA BLOWERS The design of Allis-Chalmers cupola blowers stems from 60 continuous years of building high-speed rotating equipment. Hundreds of A-C cupola blowers have been installed in foundries throughout the world . . . and the very first units are operating today! The blower you select can play a big part in overall cupola economy . . . so compare before you buy . . . prove to yourself it pays to specify Allis-Chalmers cupola blowers. Bulletin 16B6020B.



POWER AND ELECTRICAL-TRANSMISSION

In Allis-Chalmers wide range of power generation, distributi utilization and control equipment are included steam turbin condensers, pumps, generators, switchgear, voltage regulato transformers and many others. Famous *Texrope* V-belts a drives, a-c and d-c motors and controls give you high pow transmission efficiency. You can feel confident in bringing a electrical power problem to Allis-Chalmers.

Allis-Chalmers is Represented at the N.A.F.A. Convention in Detroit April 28th to May 2nd

Send for NEW Bulletin 07B6092A Describing Our Complete Foundry Line

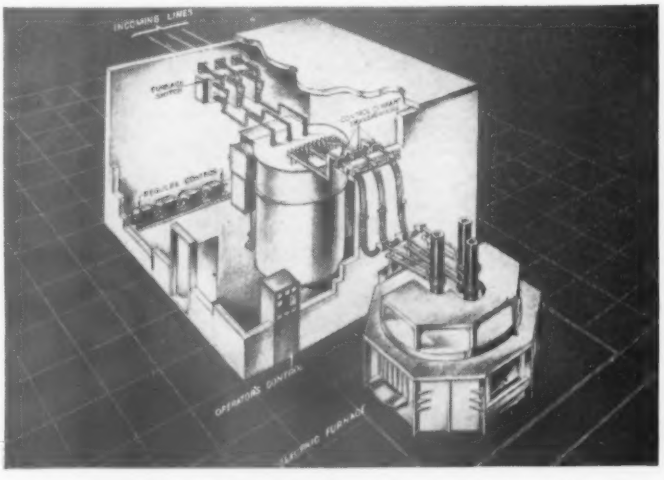
to Cut Costs!

Allis-Chalmers Wide Range of Modern Foundry, Power, and Electrical Equipment Can Help You do It!

YOU CAN IMPROVE casting quality and cut production costs with Allis-Chalmers *modern* foundry equipment. Vibrating screens, dryers-coolers, sand scrubbers, cupola blowers, shakeouts, and many other mechanized units make possible better control, conditioning and reclamation of sand . . . quicker less-costly ways of shaking out molds and cleaning castings . . . as well as simplification of other foundry operations.

In its own huge foundries, Allis-Chalmers pioneered the use of vibrating screens, hydraulic casting washers and other equipment for your industry. If you want more information on mechanization, call your foundry consultants, or contact your nearest A-C Office. Meanwhile, write for bulletin 07B6092A "Foundry Mechanization" which describes the entire Allis-Chalmers foundry line. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

MELTING Mercury arc frequency changing ... offers many advantages. It prevents ex- ...ing metals . . . resulting in closer control ...ux passing through melt create positive ...g puddling unnecessary. Further, clean ...es working conditions . . . promotes good



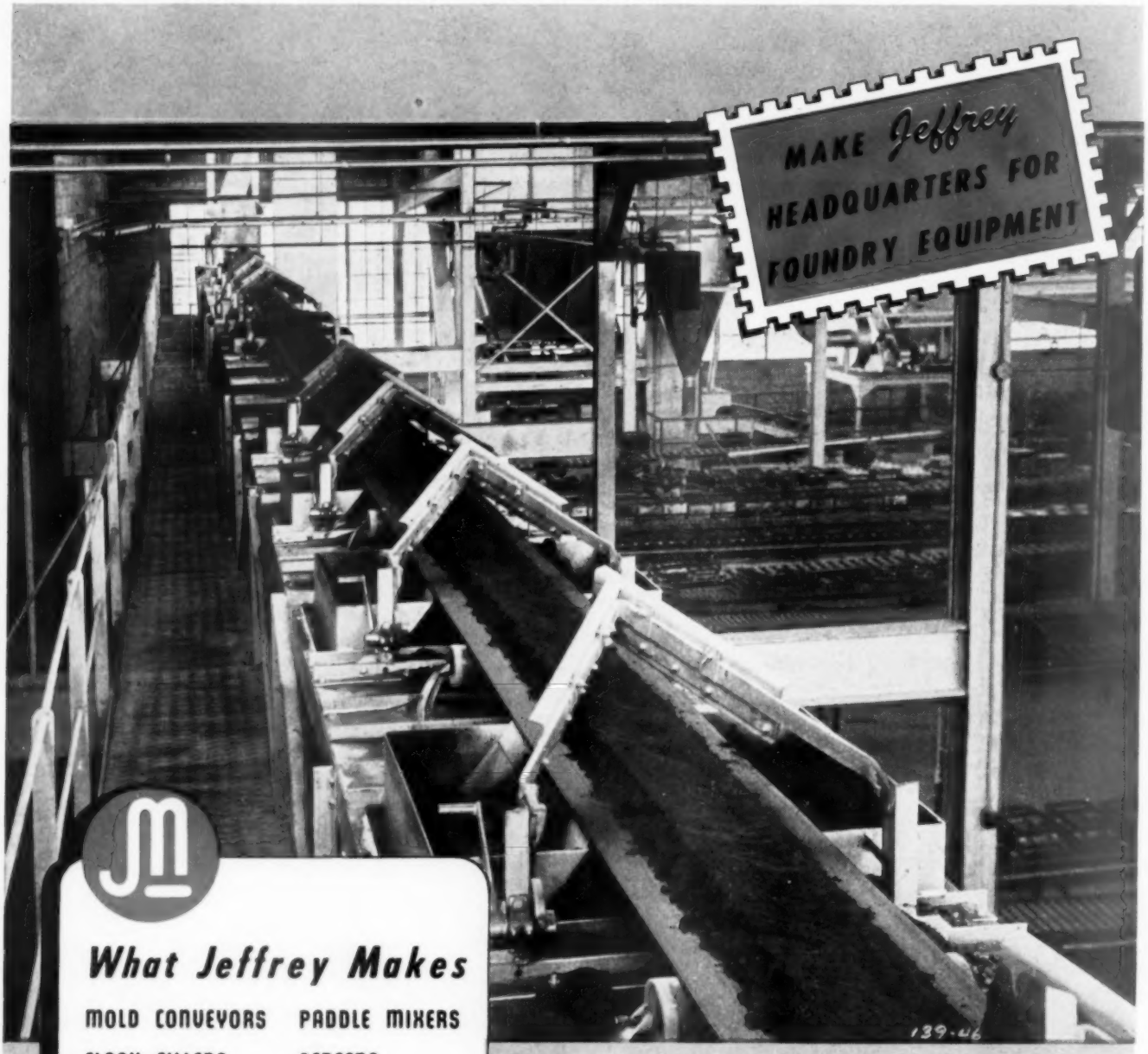
ARC FURNACE CONTROL *Regulex* control for arc furnaces consists of a continuously connected system of generators and motors. The generators supply variable voltage to the electrode motors, for lowering or raising electrodes in response to varying physical shape of the furnace charge. Accurate control of electrode position lowers kilowatt cost per ton by reducing melt-down time. It also prolongs electrode life and protects electrical system by helping prevent heavy current surges.

A 2210

...LIS·CHALMERS

... Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great



What Jeffrey Makes

MOLD CONVEYORS
PADDLE MIXERS
FLASK FILLERS
SCREENS
AERATORS
BIN VALVES
SANDITIONERS
CONVEYORS
BUCKET ELEVATORS

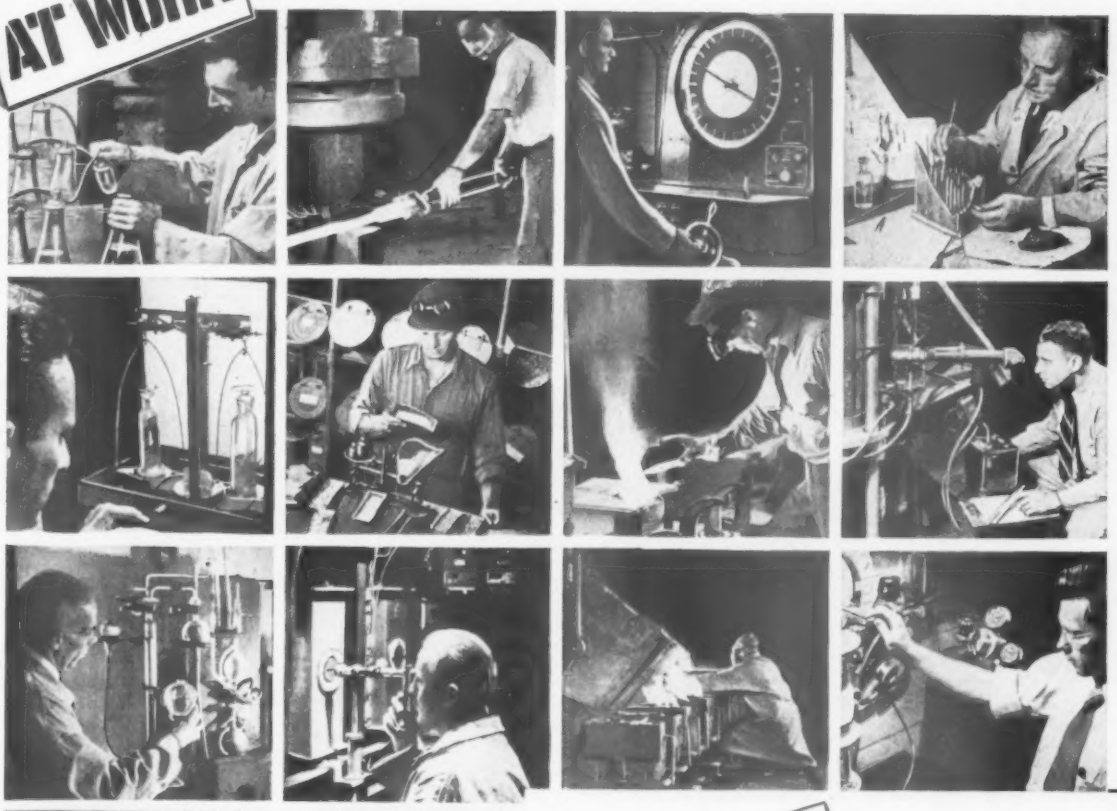
A large Sand Handling installation in a modern brass foundry showing finished sand bucket elevator and distributing belt conveyor.

THE JEFFREY MANUFACTURING COMPANY
ESTABLISHED 1877
907-99 North Fourth St., Columbus 16, Ohio

Baltimore 1 · Buffalo 2 · Cleveland 13 · Huntington 19 · Jacksonville · Milwaukee 11 · New York 7 · Pittsburgh 22 · St. Louis 3 · Salt Lake City 1

Complete Line of Material Handling, Processing and Mining Equipment

MEN AT WORK



FOR YOU

Better alloys—better steels . . . these are what Electromet's research brings to you . . . And here you see this research at work in our laboratories at Niagara Falls, New York, where more than a hundred scientists and engineers assisted by many laboratory technicians are devoting their efforts toward helping to solve your metallurgical problems. Out of their technical knowledge . . . their years of training and experience . . . and their creative minds will come many of the alloy developments of tomorrow.

ELECTROMET
TRADE-MARK
Ferro-Alloys and Metals

Produced by Electro Metallurgical Company
Sold by Electro Metallurgical Sales Corporation
Units of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

APEX 50 ALLOY

Apex 50 Aluminum Alloy is a proved alloy for its versatility in the manufacture of sand and permanent mold castings. Apex 50 Alloy assures you of economy in production and of quality castings. Booklet with full information furnished on request.

Apex Smelting Company 2537 W. Taylor St., Chicago

Research Leadership back of every Ingot

YESTERDAY...

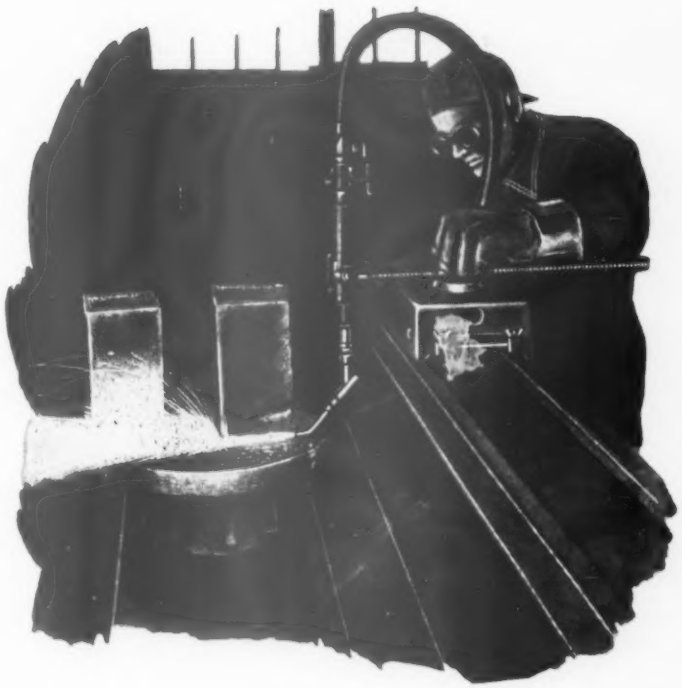
a sensational innovation

When hand flame cutting of risers was introduced to steel foundries, older operations were rapidly discarded. This method was one of the many ways in which the oxygen industry helped to cut costs in the steel foundry.

STILL LOOKING INTO THE FUTURE

TODAY... *what a change*

The oxygen industry went right on to develop an even better practice—machine flame cutting of risers. It's still faster, more economical—eliminates 75% of the grinding operation.



AND TOMORROW...?

Airco will continue its research efforts to contribute new and better methods of aiding steel casting production.

Airco's Technical Sales Division is at the call of steel foundry men in applying Airco processes in the solution of their problems. **A copy of an interesting booklet: "New and Improved Oxyacetylene Methods for Steel Foundries"—is available.** For your copy of the booklet, and for further information concerning Airco's Technical Service write: Air Reduction, 60 E. 42nd St., New York 17, N.Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas.

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

ORIGINATORS OF MODERN OXYACETYLENE METHODS FOR STEEL FOUNDRIES

the Simpson Mixer is

— says Banner Iron Works, referring to the sand conditioning system they designed, built and installed in 1943, under the very able direction of Mr. W. E. Illig

Banner Iron Works
FABRICATED STEEL PRODUCTS
GRAY IRON CASTINGS
MEEHANITE METAL CASTINGS
4560 SHAW BOULEVARD
Saint Louis 10 August 21st, 1946

National Engineering Company
549 West Washington Boulevard
Chicago, Illinois

Attention: Mr. Webb L. Kammerer

Gentlemen:

During the defense program, we operated our foundry at approximately 400 tons a month with a #1 Simpson Muller which was purchased about 1910.

As the foundry demands for better mulled molding and core sands developed, and due to increased war production requirements, this small muller was forced to operate from 20 to 24 hours per day, and was still far below meeting the demands for properly conditioned sands. During 1940 a sand conditioning system was designed. This system was such that all of its various details had to function or the foundry could not operate. After some investigation, it was decided to purchase for this system, a #36 Heavy Duty Simpson Muller. The system was installed early in 1943. The equipment was originally designed to handle, the main bay, which requires about 100 tons; the side floor, 25 tons; and, two rollover machines, demanding about 100 tons, totaling about 225 tons daily. In addition to the main floor, heap and facing sands, core sand requirements are also prepared in this system.

After operating approximately a year on this basis, it was decided to condition the sqeezer floor sand in the same system. The sand required for these floors is approximately 30 tons daily. As we use all synthetic mixes, all heap and facing sands pass through this system daily.

It goes without saying that the Simpson Muller is the heart of this system. In the event a defect occurred in the Muller, all molding operations would be forced to stop for want of sand as no sand is stored on the foundry floor. We are happy to say that we have had 3½ years of continuous operation, without shutdown, and that during this period, only a few minor repairs on the muller were necessary and, thanks to the service that the National Engineering Company gave us, we were able to make these minor repairs without interruptions in our molding operations.

Yours very truly,

BANNER IRON WORKS

W. E. Illig

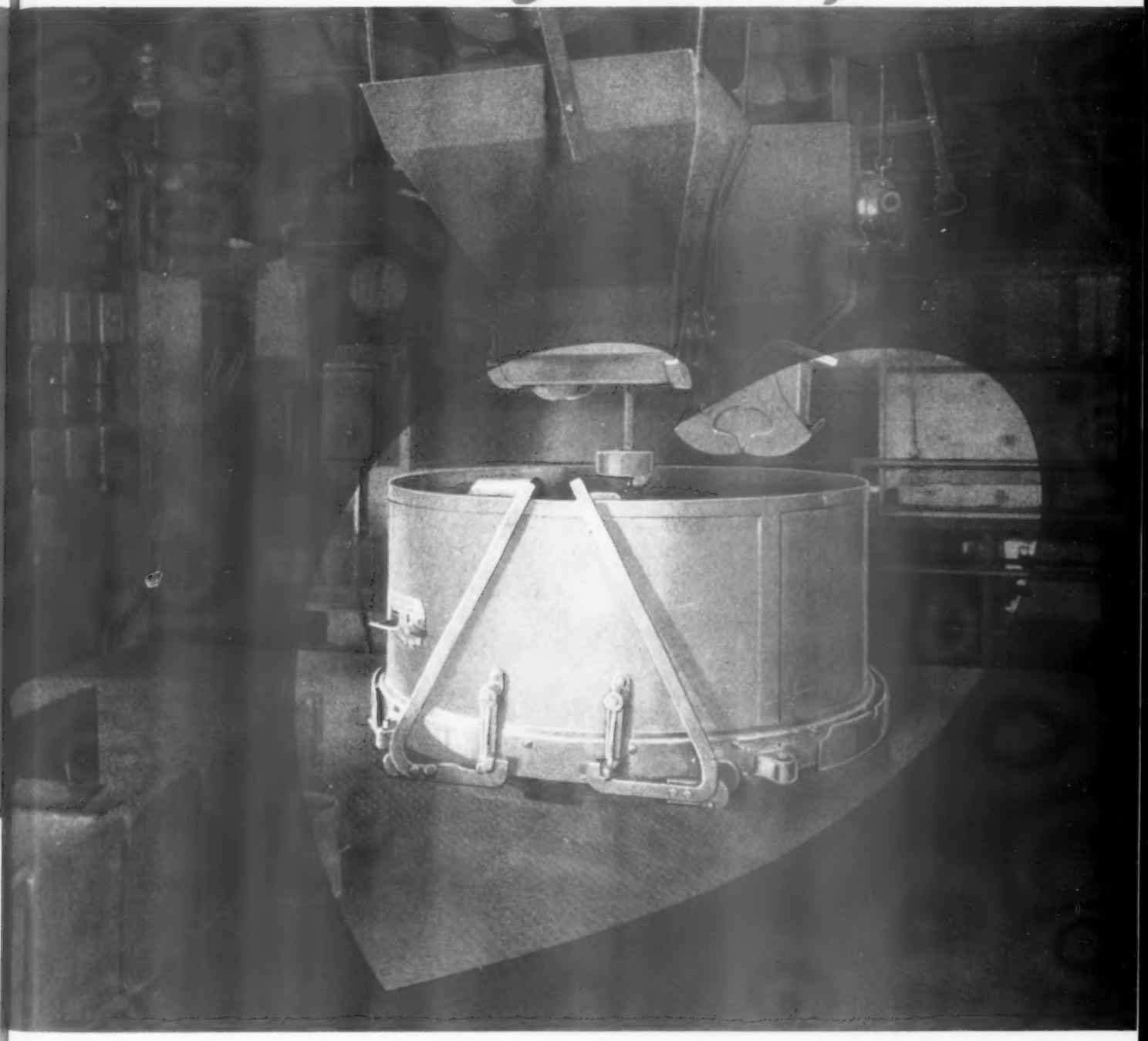
W. E. Illig
Vice President

• The accompanying letter is indicative of the way in which Simpson Mixers are meeting foundry demands for a greater production of better quality molding and core sands . . . day after day, year after year.

This evidence of superior performance is not an isolated case. On-the-job reports in foundries both large and small prove that Simpson Mixer installations are constantly producing foundry sand better, faster and at less cost.

Ask a National Engineer to discuss the details with you.

the heart of this system



• Illustrated here is the No. 2 Simpson Mixer referred to as the "heart" of the sand conditioning system at the Banner Iron Works foundry, which has now had 3½ years of continuous operation without shut-down.

MANUFACTURER'S ASSOCIATION INC. FOUNDRY EQUIPMENT

NATIONAL ENGINEERING COMPANY

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- Use limit 3000F
- Melting point 3190F
- High spalling resistance
- Low volume change on initial firing
- Negligible reheat shrinkage
- Ease of application

—these are among the important properties which make B&W KAOCAST an outstanding castable for high temperature applications, ranging from the use limit of standard castables up to as high as 3000F.

B&W KAOCAST, which can be either rammed or poured into place, will effect significant savings in such uses as:

1. forming special shapes
2. furnace linings
3. car tops
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For more information on this remarkable new development of B&W Refractories Research, send for the informative B&W KAOCAST Bulletin — or call your local B&W representative.

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B&W

Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories . . . Process Equipment.

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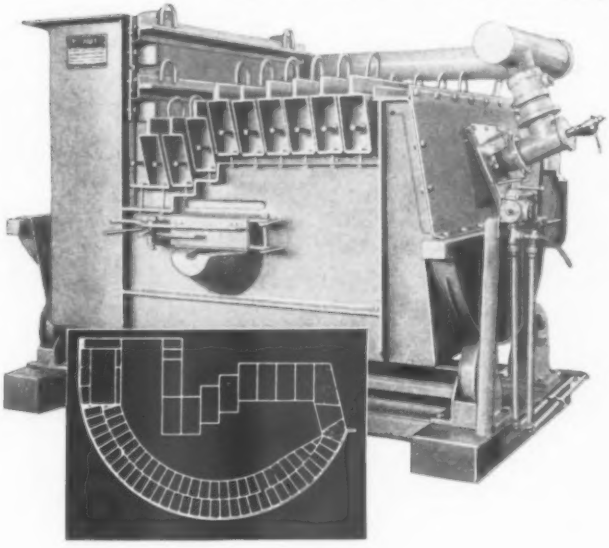

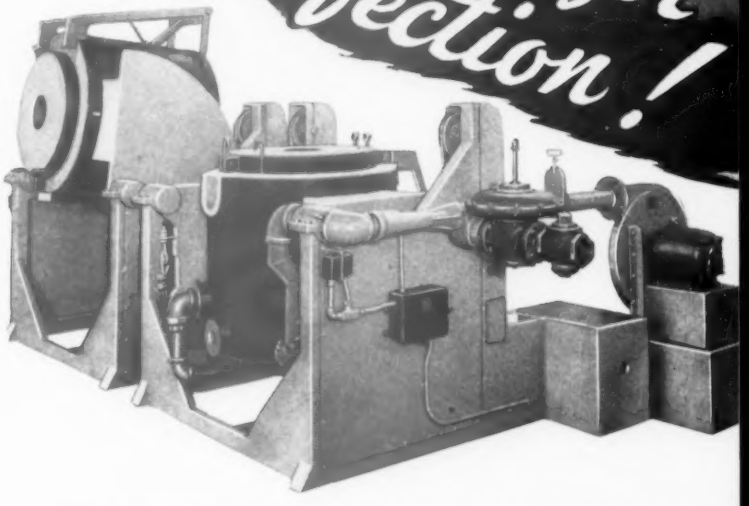

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For Brass, Bronze, Aluminum and other non-ferrous metals. These Stroman Furnaces embody the famous Stationary Lip Pour Feature which assures a constant pouring arc, eliminating the necessity of moving the ladle at any time during a pour. They are excellent for use in permanent mold and die casting plants as well as any foundry. Their sturdy construction assures longest life, and their economical operation results in lowest production costs. Choice of oil or gas fire. Built in sizes to handle capacities from No. 125 to No. 400 crucible.

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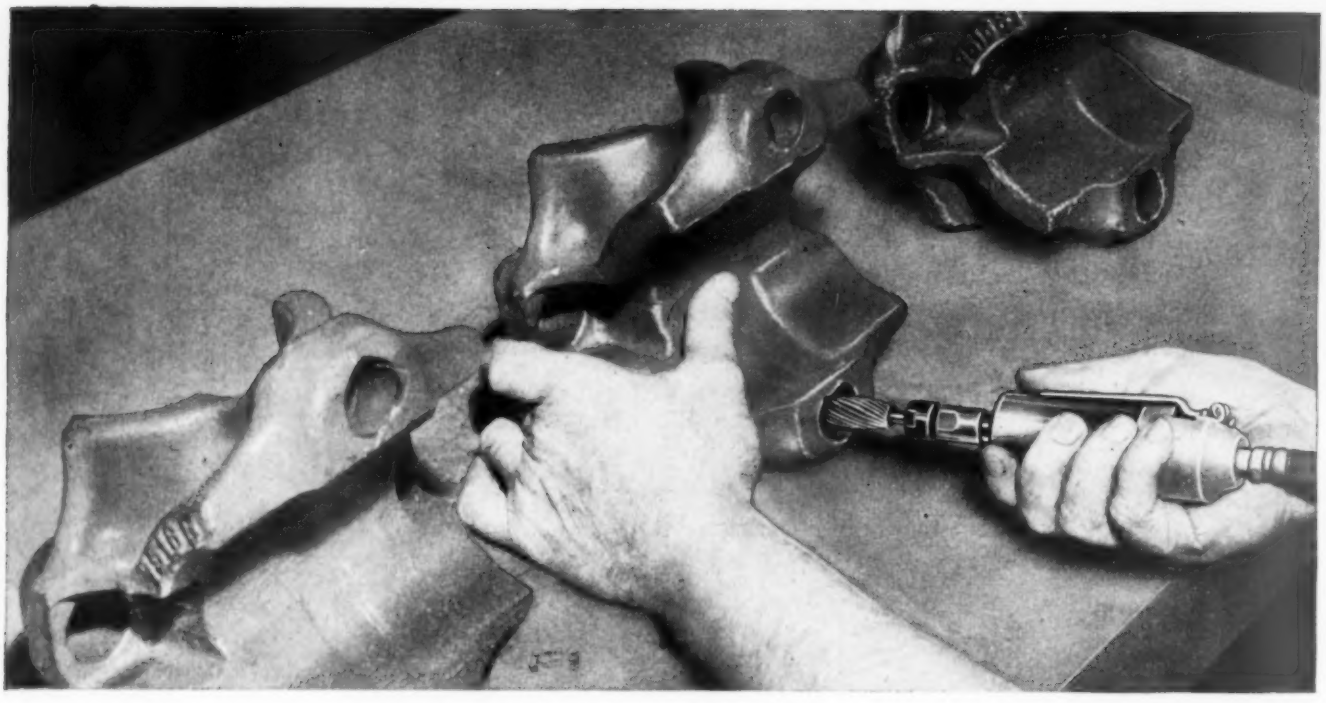

CP-3010 Pneumatic Die Grinder, equipped with tungsten carbide rotary file, being used for high-speed burring of steel castings.

CUT YOUR BURRING COSTS with Rotary Files

Chicago Pneumatic's wide range of small pneumatic grinders includes tools of ample power and speed for all types of rotary file work. Small, light, compact design provides perfect balance. Rotary operation insures a smooth, vibrationless flow of power. CP rotary air motors always run cool, and cannot be harmed by overloading.

Invaluable for a multiplicity of uses, tools are furnished with numerous handle and throttle designs, as well as spindle extensions and adapters, to meet specific requirements.

Made in over-all lengths of 5⅞", 9" and 12¼"; they can also be furnished with 14" and 27" extension spindles. Wheel capacities up to 2½" in diameter. Weights: 1¼, 3 and 3½ pounds.

These versatile rotary tools can also be used with drills, steel cutters, mounted points, wire wheels, polishers, and other attachments. Write for complete specifications.

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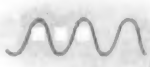

MINING—Agents for digestion of insoluble ores.

METALLURGY—As ingredients in fluxes and pastes for welding, brazing or soldering. For surface preparation of aluminum and stainless steel before spot welding.

General Chemical Fluorine Research announces Potassium Bifluoride and Potassium Polyacid Fluoride to American Industry. These are versatile, reactive products whose properties indicate varied applications. For example, consider their potentialities in the fields suggested here.

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When writing for the information you need, why not outline your proposed uses for these products? This way the technical experts of our Fluorine Division can work with you toward an early solution of your problem.

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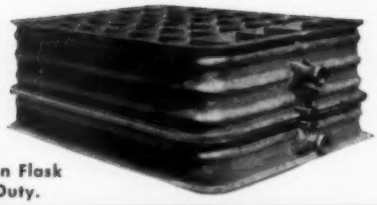
Model TM-10 Truscon Flask for Two-Man Handling.



Model CH-40 Truscon Flask for Extra Heavy Duty.

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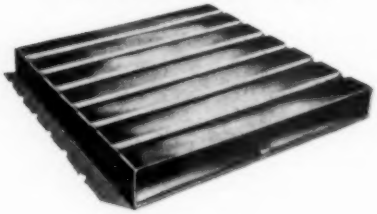
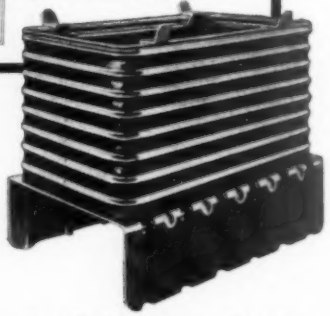
Type PB-650 Truscon Box and Platform with sliding End Door.

Type PB-120 Truscon Steel Box and Platform.

Truscon Double Face Steel Pallet.





Type PB-120T. Truscon Steel Box and Platform with Tiering Lugs.

This Maehler unit...

replaced { 4 car-type, coke-fired ovens / 1 drawer-type oven

The Maehler unit shown above, installed at the Harnischfeger Corporation in Milwaukee, Wisconsin is a double compartment four rack Lift Door Core Oven with an oil-fired automatically controlled airheat system. Doors are equipped with new electrically-operated lift. Push buttons to operate the doors are mounted on flexible extension brackets to front of oven, permitting lift truck operator to open doors while guiding truck into position for loading core racks into oven.

WHEN THE Harnischfeger Corporation of Milwaukee, Wisconsin modernized its facilities for core baking, the Maehler Lift Door Core Oven shown above was installed . . . The results were typical . . . the Maehler unit did a faster and more thorough core baking job . . . a job that enabled it to replace four car-type, coke fired ovens and one drawer oven! This meant a substantial cut in production costs as well as better-baked cores.

The new Maehler oven, a four rack, double compartment oven with an oil-fired automatically controlled airheat system, handles four 5 ft. 6 in. x 5 ft. 6 in. x 5 ft. adjustable racks. After installation the core baking schedule of the oven was two bakes per day on small and medium size cores. Larger cores were baked overnight. Total weight of cores per bake is approximately 8,000 to 10,000 pounds.

For *better* cores, baked faster and at lower cost . . . plan now to install a Maehler Core Baking Oven in your plant.

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Industrial Ovens and Furnaces for Core Baking, Mold Drying, Heat Treating, Enameling, etc.

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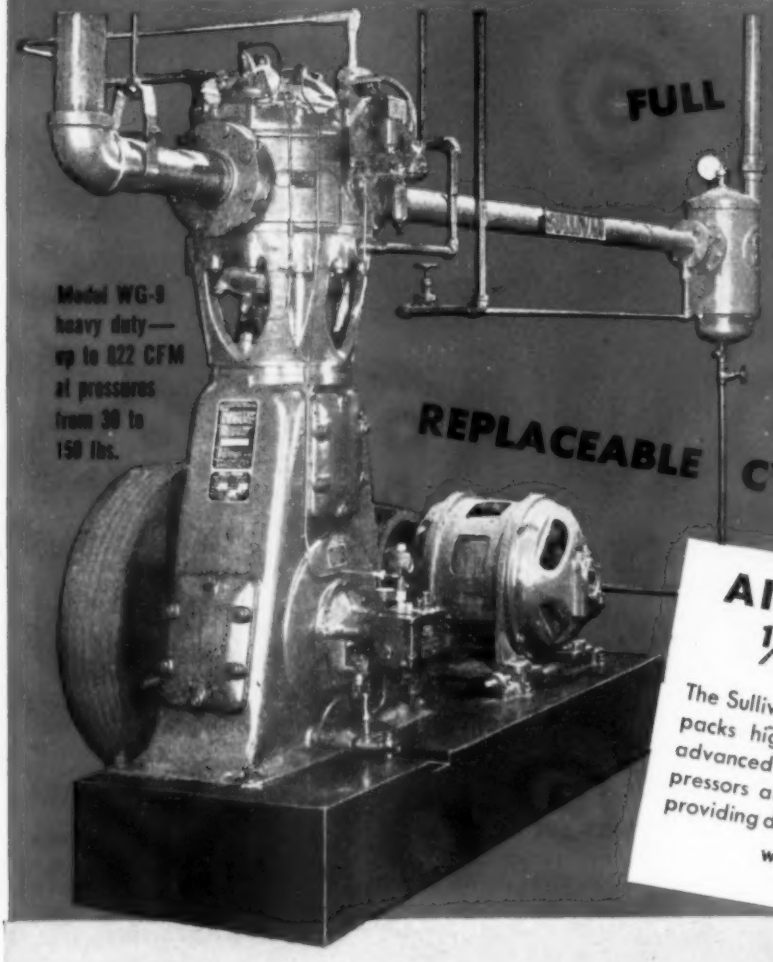
WITH EFFICIENT SULLIVAN COMPRESSORS



Model WG-9 heavy duty—up to 822 CFM at pressures from 30 to 150 lbs.

FULL FORCE FEED LUBRICATION

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REPLACEABLE CYLINDER LINERS

AIR COMPRESSORS
¼ HP to 600 HP

The Sullivan WG-9, like all Sullivan Air Compressors, packs high capacity into minimum space through advanced engineering and design. Sullivan Compressors are in satisfactory use throughout industry, providing dependable air power year in and year out.

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Precision Built

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Valveless

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Dallett Pneumatic Tools are made in a number of sizes and designs for many specific uses . . . valve and valveless type, with button, lever or handle control:

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Dallett's—"Dalbo"—Air Hose Fittings and Couplings are machined from solid bar stock—are leakproof—with safety locking sleeve.

Forged Tools

"Dalbo" Interchangeable Pipe Ends

Dallett chisels and blanks are made in most standard shanks—safety retainer chisels are available for most makes of small pneumatic tools.

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"Dalbo" Couplings

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Safety Retainer Chisels

TOOL MAKERS

PNEUMATIC DALLETT EQUIPMENT ACCESSORIES

SINCE 1883

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The number of possibilities is almost unlimited, of course. But in foundry practice, the most important are copper base alloys, aluminum base alloys and magnesium base alloys, all produced in time-tested analyses by Federated Metals Division.

For foundry casting, Federated makes all of the commercial copper base alloys . . . the aluminum base alloys for use "as-cast" or heat-treated, and for sand molds, permanent molds or die castings . . . magnesium base alloys . . . deoxidizers and addition agents.

From Federated's complete line you can select alloys that produce castings of special ornamental value, high strength-weight ratio, excellent wearing qualities, special resistance to corrosion, or sharp detail. A Federated technical representative will help you select the right alloy for your special casting needs. For the office nearest you, consult your phone book or write *Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, N.Y.*

Federated Metals is first with a complete line of metals for the non-ferrous foundry:

manganese bronzes
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"DOC" TILLITY
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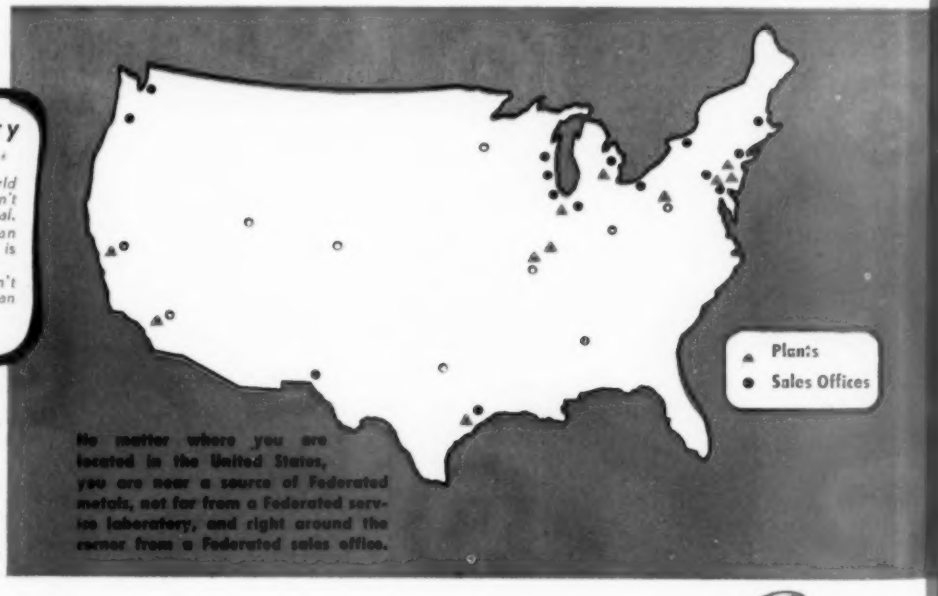
"The best steak in the world will turn out bad if it ain't cooked right; same for metal.
More good metal than you can shake a stick at is spoiled by wrong melting.
Take my advice. Don't overheat. Melt fast. Use an oxidizing atmosphere."
M.D.


Plants
Sales Offices
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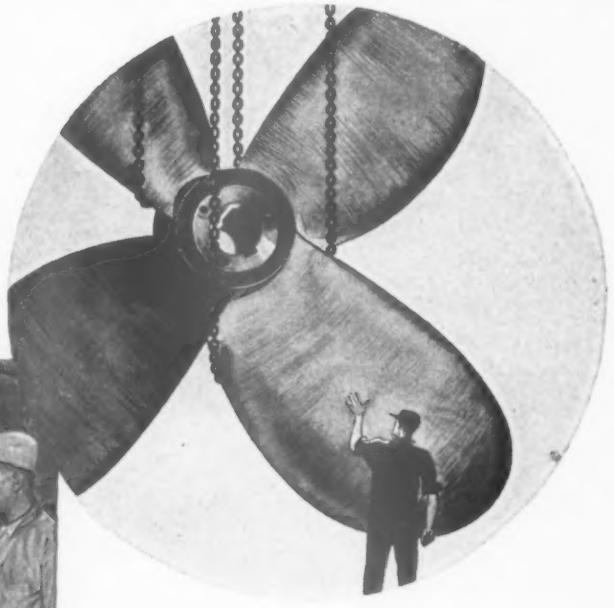
Federated METALS DIVISION

AMERICAN SMELTING AND REFINING COMPANY

Federated first in the non ferrous field

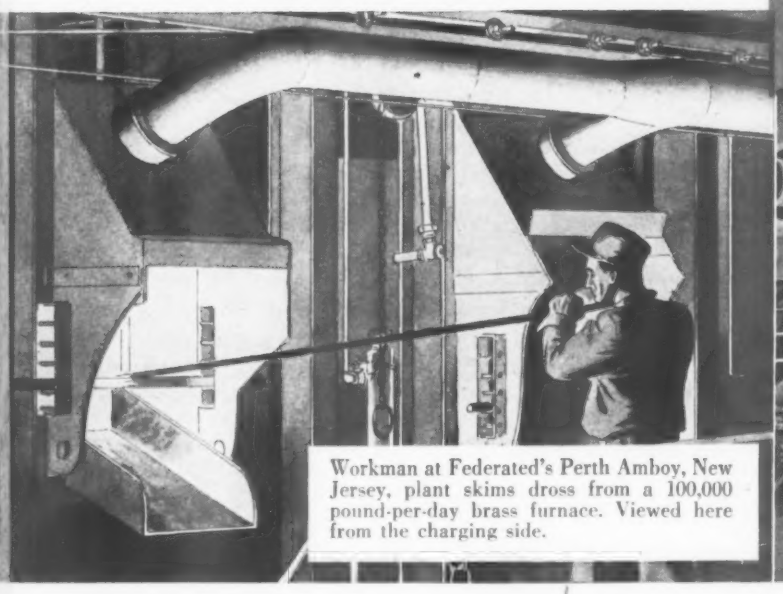
FMD

It took 90,000 to 100,000 pounds of metal to cast this 22-foot diameter manganese bronze propeller, weighing 60,000 pounds finished. It is among the largest ever made. *Picture: courtesy The Baldwin Locomotive Works.*



Casting aluminum on a straight-line casting machine. The metal is tapped from a reverberatory furnace having a daily capacity of 70,000 pounds.

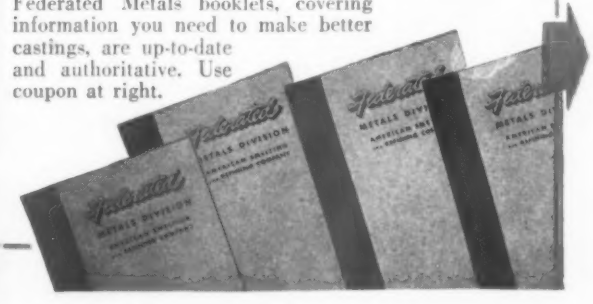
The aluminum ingot molds, part of an endless conveyor, are readily stripped at the discharge end of the machine, and drop into skid-bins for transfer by fork trucks.



Workman at Federated's Perth Amboy, New Jersey, plant skims dross from a 100,000 pound-per-day brass furnace. Viewed here from the charging side.

JMLCo F:D1

Federated Metals booklets, covering information you need to make better castings, are up-to-date and authoritative. Use coupon at right.



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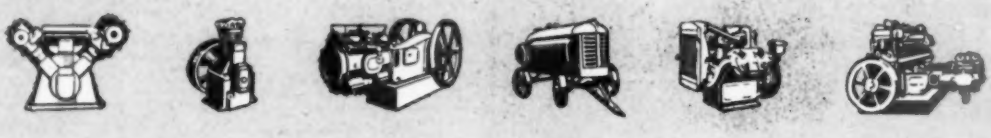

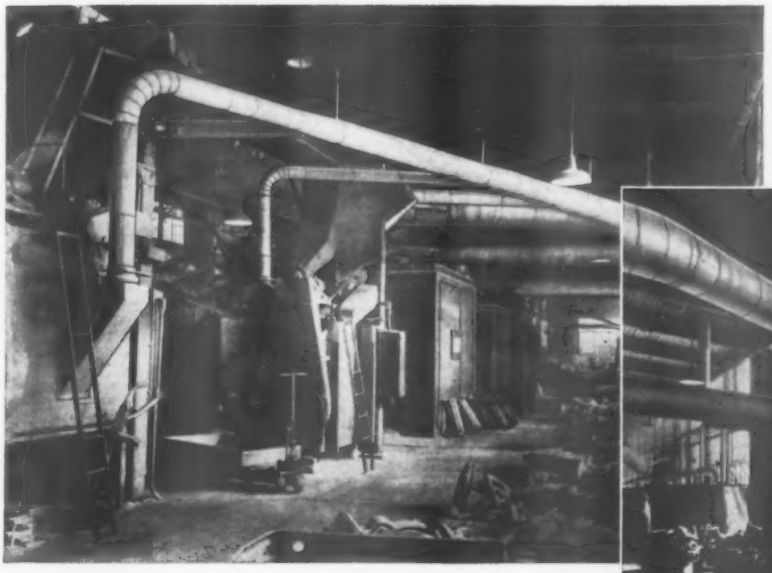

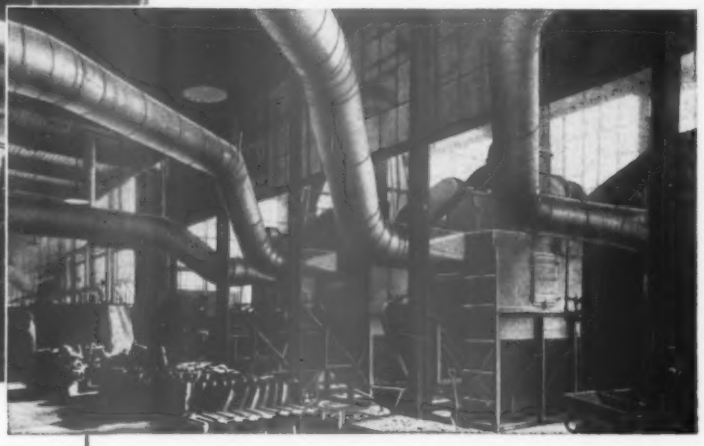

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The Right Sand

The Great Lakes Line

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Chrome Ore
Nepheline Syenite

JUNIATA—The right sand for cores.

High green strength—No clay or lime defects—
Saves cereal and clay binders—Saves Core Oil.

JUNIATA—The right sand for molds.

Bonds adhere readily—Highly refractory
Uniform grain distribution—Highly permeable.

JUNIATA—The right sand for facing.

Resists metal penetration—Gives sharper profile—
Natural primer coating reduces mulling time.

Additional Advantages—

Where Juniata is used in facing sand, a matchless finish to the castings is obtained. In addition, less ground silica and bentonite is required, permeability is raised. In cores for steel castings, less binder is required, permeability is increased.

USE HIGH REFRACTORY JUNIATA FOR BEST RESULTS!

Great Lakes

• • Miners—Processors—Foundry,

UNITED ARTISTS BLDG.

Juniata

TRADE MARK REGISTERED

The UNIVERSAL FOUNDRY SAND

	JUNIATA Fine	JUNIATA Coarse	WILMOT	LAKE CICOTT Indiana
A.F.A. Fineness	102	87	56	77
Grain Distribution	70	76	76	82
A.F.A. Clay Content	1.7%	.9%	.8%	2.0%
Base Permeability	40	44	110	44
Permeability at 3.5% Moisture	80	82	170	80

Chemical Analysis of Juniata Sands

Silica	90.16%	Ignition Loss	.65%
Aluminum Oxide	4.66%	Titania	.27%
Iron Oxide	1.18%	Alkalies	2.77%
Calcium Oxide	.21%	Magnesium Oxide	.10%

Fusion Temperature 3092 deg. F

"nature-made" to your requirements

Juniata, the accepted standard sand for cores and molds in hundreds of foundries, has a primer coating ideally fitted to accept clay bond readily. Using grades, based on grain sizes from 56 to 102 A.F.A., with our recommended bonds, you can have "tailor-made" molding sands for light, medium and heavy castings. Such sands reduce cleaning costs and produce castings of unsurpassed finish.

Join the hundreds of non-ferrous, gray iron, malleable and steel foundries now using Juniata. Place this outstanding sand on this year's schedule.

Welcome to Detroit
April 28 - May 1

Visit our Offices-
Across Street from
Hotel Statler

Foundry Sand Co.

Metallurgical and Sand Blast Service • •

DETROIT 26, MICHIGAN

COMPETITIVE BID SALE

ABRASIVES

WAA solicits bids for approximately $1,000,000 worth of abrasives of the following types: grinding wheels, abrasive cloth, paper, belts, sticks, stones and hones—all sizes and specifications. The offering includes both new and used materials; inspection may be made prior to bidding at any Regional Office holding the inventory. Priority claims have been satisfied and there will be no delay in delivery.

Sales of Abrasives will be held at frequent intervals. To receive information on future sales, write to the Regional Offices listed below asking that your name be placed on their mailing lists.

BOSTON • PHILADELPHIA • CHICAGO • CLEVELAND
DETROIT • ST. LOUIS • LOS ANGELES

OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION

GOVERNMENT WAA SURPLUS

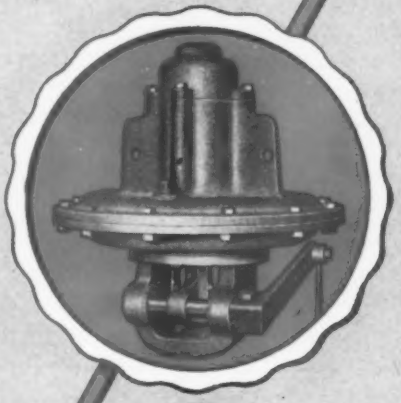
Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

1020

SERIES 600

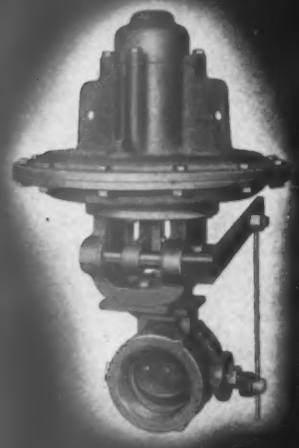
DIAPHRAGM AIR MOTORS

Furnished as one unit — complete with North American Adjustable Port Valves.



Used with pneumatic type instruments for throttling control of air, gas, oil, water or steam.

Adjustable Port Fuel Valve and Motor



Butterfly Air Valve and Motor

Adjustable Port Air Valve and Motor

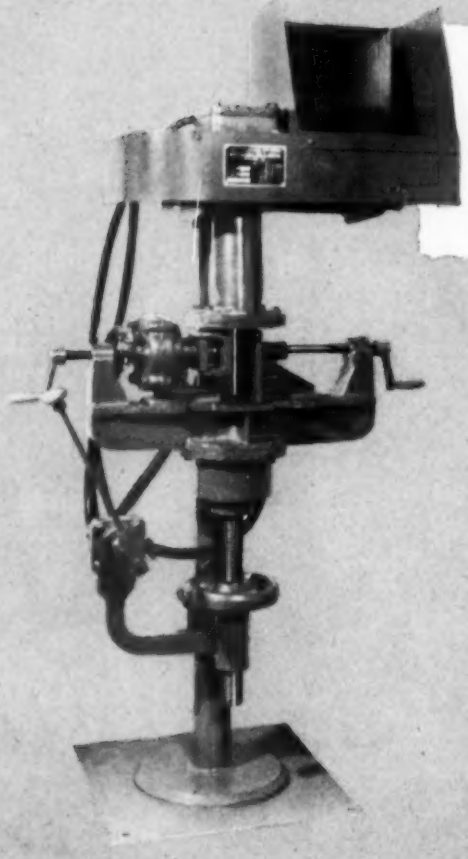
by NORTH AMERICAN

For Combustion

THE NORTH AMERICAN MFG. CO.

GAS OR OIL COMBUSTION EQUIPMENT • BRANCH OFFICES IN PRINCIPAL CITIES

CLEVELAND 5, OHIO



POPULAR

The entire line of DEMMLER core blowing machines is popular because every DEMMLER core blower has proved itself a dependable, profitable investment.

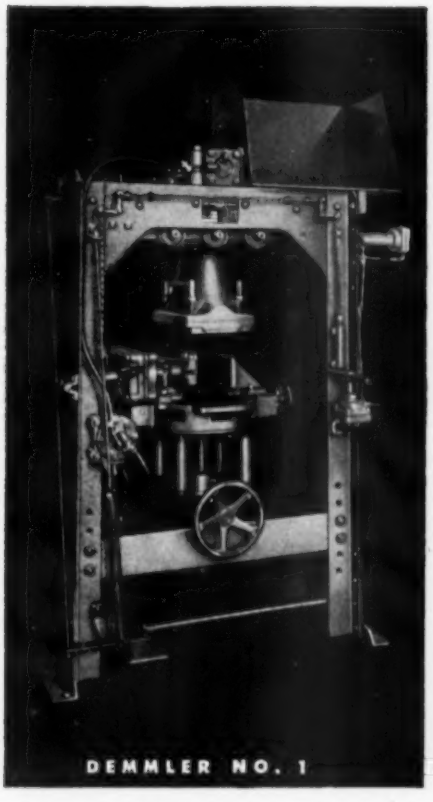
It is no news to the Foundry world that three prime requisites of profitable core making are rapid production, economical operation and the production of high quality cores. DEMMLER machines can be depended upon to meet all three of these requirements.

DEMMLER machines are ruggedly built throughout for hard foundry use. All have both horizontal and vertical adjustments. Jobs are easily and quickly changed.

Available in a wide variety of sizes to meet every requirement, DEMMLER core blowers possess scores of refinements born of long experience. First in the field, DEMMLER core blowers have led the field since 1911.

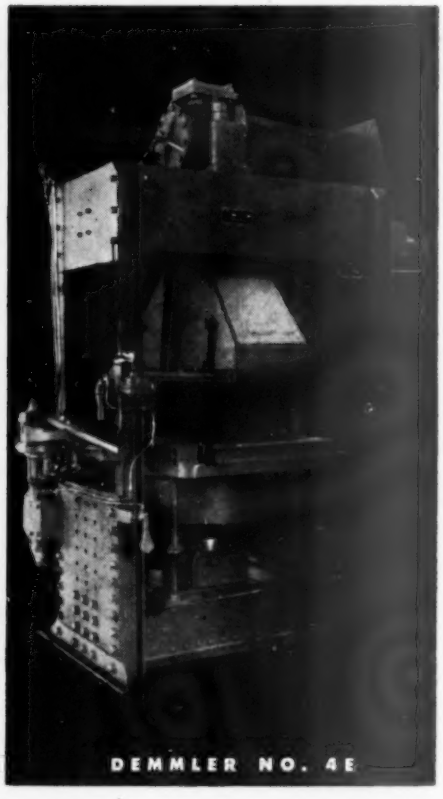
Before you buy a new core blower, be sure to investigate the many advantages DEMMLER machines offer. You'll be glad you did!

DEMMLER NO. 50



DEMMLER NO. 1

DEMMLER NO. 3E



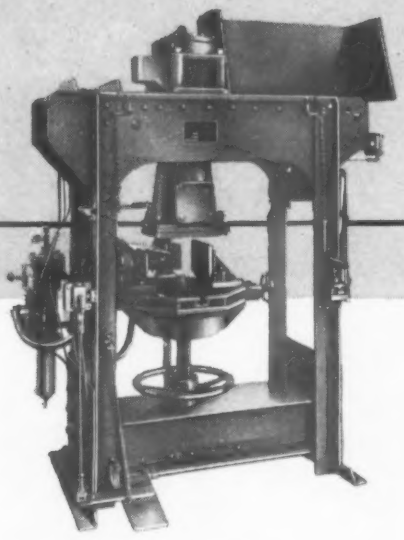
DEMMLER NO. 4E

MANUFACTURERS OF CORE BLOWERS EXCLUSIVELY SINCE 1911

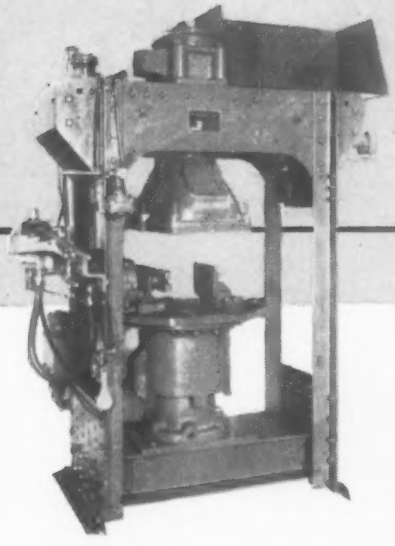
because they are profitable to own

DEMMLER

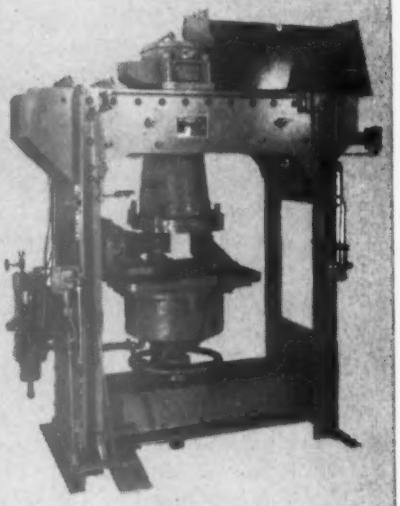
CORE BLOWING MACHINES



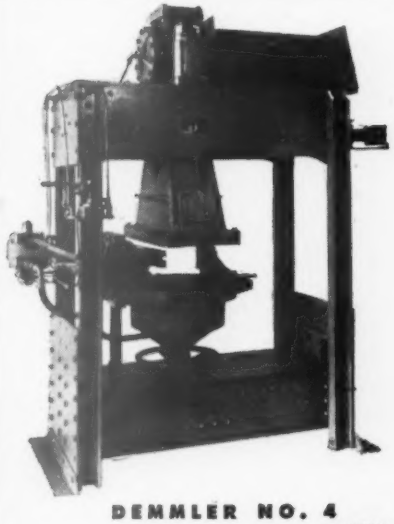
DEMMLER NO. 2



DEMMLER NO. 2E



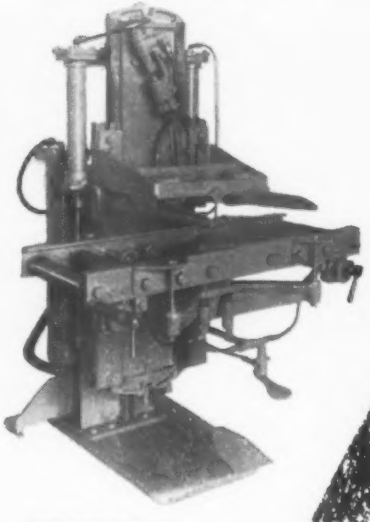
DEMMLER NO. 3



DEMMLER NO. 4

CORE BOX VENTS

Wm. Demmler & Bros. also manufacture a complete line of precision made core box vents —rigidly constructed in varying sizes of slotted brass, slotted steel and screen mesh.



DEMMLER
CORE ROLL-OVER
DRAW MACHINE

Wm. **DEMMLER** *& Bros*
Kewanee, Illinois

Famous CORNELL

Famous CORNELL IRON CUPOLA FLUX

CLEANSES MOLTEN IRON. It has a purging action which causes rapid elimination of slag and other impurities, and keeps slag fluid.

It makes iron hotter and more fluid, enabling you to pour castings that are denser grained, stronger and cleaner.

It makes machining definitely easier.

IT KEEPS CUPOLAS CLEAN—by forming a glazed or vitrified coating over brick in melting zone. This not only prolongs life of brick but insures clean cupolas—clean drops—and cuts maintenance cost amazingly.

Exclusive Scored Brick Form

enables you to flux a charge of iron in a few seconds—correctly—and without waste of flux as it cannot blow out with the blast as in the case of flux in other forms. It stays in melting zone until entirely consumed.

Write for Bulletin 46-B

Greatly C Casting S

MAKE METAL CLEAN AN

You Greatly REDUCE

CHILLED S
HOLLOW C
SPONGY S
UNEVEN G

You Avoid ...
CASTING REJECTS AN

The CLEVELAND FO

1026-1036 MAIN AVENUE, N.W., CLE

Manufacturers of Iron, Brass and Alumi

METAL FLUXES

Improve Structure

AN AND FREER FLOWING

D SIDES
W CENTERS
Y SPOTS
N GRAIN

TS AND MAKE-OVERS

Famous CORNELL BRASS FLUX

CLEANSES MOLTEN BRASS, even when the dirtiest brass turnings are used.
Castings come tougher, sounder and denser grained, which is vitally essential in the manufacture of any casting which must stand the pressure test and take an extra fine finish.
Several elements in this flux combine to gather the gases while the metal is being melted, and cause them to form into balloon shaped bubbles and rise to top of metal in the form of slag which is very essential as a cover to retain heat during transfer to molds.
Less tin and other metals are required.
Crucible and furnace linings are preserved.
Write for Bulletin 46-A

Famous CORNELL ALUMINUM FLUX

CLEANSES MOLTEN ALUMINUM. By removing all foreign matter it enables you to pour castings with stronger, tougher and thinner sections.
More scrap can be used without danger of dirt, porous places or spongy spots.
ABSOLUTELY NO FUMES! Exclusive formula prevents obnoxious gases, improves working conditions.
Metal does not cling to dross.
Write for Bulletin 46-A

Famous CORNELL LADLE FLUX

KEEPS LADLES CLEAN AND CLEANSES METAL. Before tapping cupola, place a few ounces of this flux in bottom of ladle. It thoroughly cleanses the iron, bringing any impurities to top of metal in the form of a cake (but fluid) which is easily skimmed off. If molds are some distance from cupola, a handful of this ladle flux sprinkled on the top of metal acts as a cover and prevents chilling.
INCREASES LADLE LIFE. REDUCES PATCHING.

D FLUX Co.
CLEVELAND 13, OHIO

FAMOUS CORNELL FLUXES
Trade Mark Registered

and Aluminum Fluxes. Since 1918

·HIGH SILICON IRON·
JISCO

5 GOOD REASONS WHY Foundrymen Prefer JISCO SILVERY

By Andrew Jackson

"There are no necessary evils in government. Its evils exist only in its abuses. If it would confine itself to equal protection, and, as Heaven does its rains, shower its favors alike on the high and the low, the rich and the poor, it would be an unqualified blessing."

Because JISCO is strictly a blast furnace product, smelted from virgin ores. Contains no contaminating scrap.

Because JISCO is filtered through molten slag at 3000°F., thus removing all oxides and foreign material.

Because JISCO, with its pre-determined percentages of silicon, added to your scrap and other melting stock yields a sound metallurgical product.

Because castings containing JISCO have a more uniform, closer grained and sounder structure, which means less rejection and scrap loss.

Because castings containing JISCO are easier to machine, are more resistant to wear, and more satisfactory to your customers.

MAY WE GIVE YOU COMPLETE INFORMATION?

THE JACKSON IRON & STEEL Company
JACKSON, OHIO.

Electro

HIGH-SPEED SNAGGING

Electro HIGH SPEED Snagging Wheels reduce this ordinarily time-consuming, preparatory job to no more than an incidental interruption of truly productive operations. They bite brutally. They resist pressures and defy shocks. Operators confidently "sock the loads to 'em" whether working on bars, billets, forgings or castings of stainless steel or soft brass. We'll gladly give you job-side engineering co-operation.

•

ELECTRO REFRACTORIES & ALLOYS CORPORATION

MFRS. • REFRACTORIES • CEMENTS • CRUCIBLES
GRINDING WHEELS

344 DELAWARE AVE. • BUFFALO 2, N. Y.

West Coast Warehouse—Los Angeles

•

Our new grinding wheel manual is the most talked-of catalog in industry. Gives technical details from basic abrasives to special purpose wheels. Illustrated in *full color!* Send for your *free* copy right now!

H-333

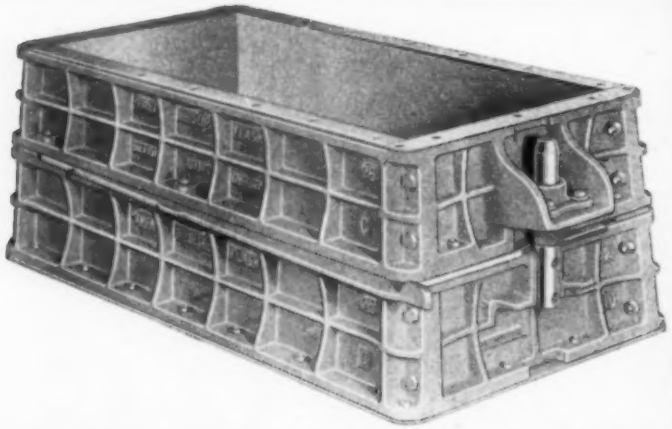
Electro HIGH SPEED GRINDING WHEELS

Electro SINCE 1919

Cast Iron

JACKETS

Are Best by Test



FREMONT MAGNESIUM FLASKS

ACCURATE.

STURDY...

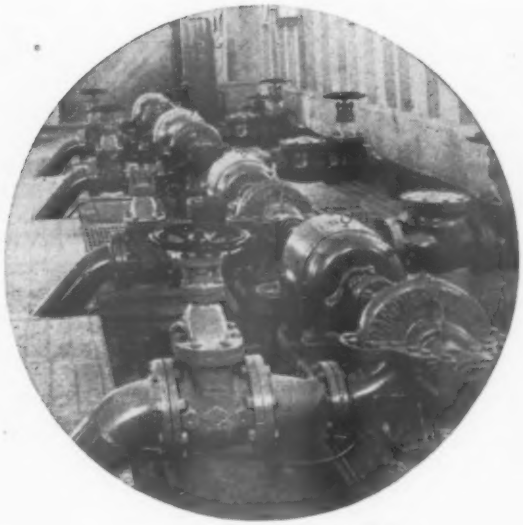
LIGHT.....

BUILT FOR LONG SERVICE AND FAST PRODUCTION

GROOVLOCK

THE FOOL-PROOF PIN

THE FREMONT FLASK CO.
Fremont, Ohio

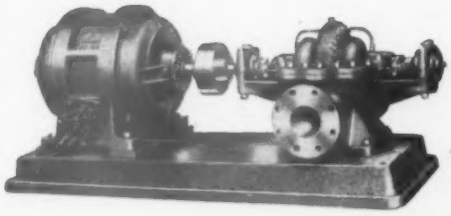


Pumps with a DIFFERENCE *that means savings for* YOU

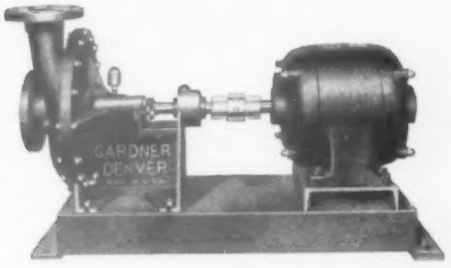
It's no trick to design a centrifugal pump that will give *passable* service. But to give such pumps the extra measure of efficiency that saves you the most money requires skilled engineering—rigidly controlled foundry practices—plus long experience. Gardner-Denver centrifugals do a better job because they are hydraulically and mechanically *right*—because their water passages are properly proportioned—because castings are absolutely smooth. For complete information about any of the pumps shown on this page, write Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER

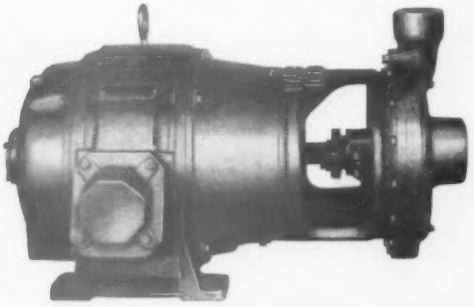
SINCE 1859



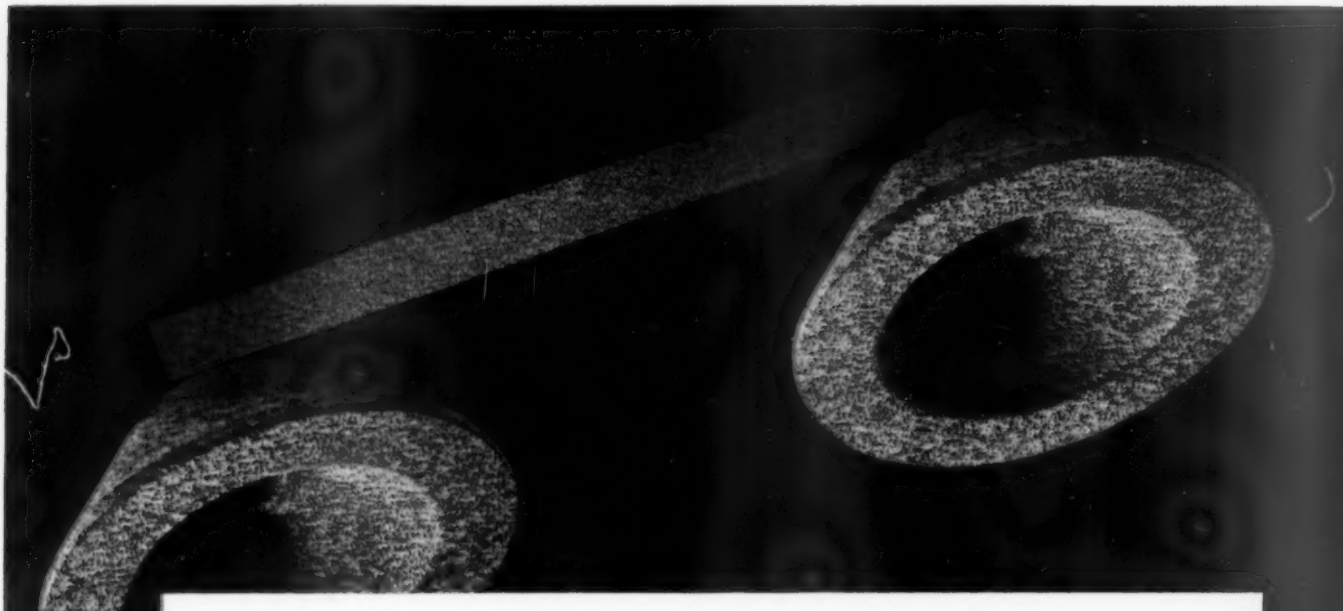
Easy accessibility *is a feature of Gardner-Denver Double-Suction, Single-Stage Centrifugal Pumps. Available in sizes to cover all heads up to 300 feet. In the first year of operation, these pumps often save enough in power costs to pay for themselves and their motors.*



Low in first cost—*easy to install; Gardner-Denver Side-Suction Pumps are ideal for replacement of outmoded units in general service. Capacities up to 2.3 million gallons per day or 1600 gallons per minute can be handled at heads up to 100 feet.*



Upside down—*or right side up—these Gardner-Denver Close-Coupled Centrifugals operate efficiently—take little space—because pump and motor are combined. Gardner-Denver Close-Coupled Centrifugals are designed for capacities up to 250 gallons per minute and heads up to 250 feet.*



Direct line to lower grinding costs

Are you interested in information that may cut your grinding expenses considerably?

Such information is available through a complete analysis of your grinding operations. This analysis may reveal something you have never suspected —that you are grinding away profits every day.

To remedy the situation, call in Peninsular engineers, specialists in grinding problems since 1889. They will study your grinding from start to finish. From this study, they will give you the answers that plug you in on the direct line to lower grinding costs.

Peninsular engineers have learned that each grinding job has special needs. That's why *every* Peninsular grinding wheel is specially made for its particular job.

The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Boston, Buffalo, Cleveland, Newark, Pittsburgh, Houston, St. Louis, Cincinnati.

PENINSULAR

INDIVIDUALLY PENINSULAR *ENGINEERED*

GRINDING WHEELS

SINCE 1889

SPECIALISTS IN RESINOID BONDED WHEELS

This Peninsular grinding wheel telephone has a cup wheel transmitter, a straight wheel standard, and a dish wheel base.

Molded to Perfection!

DORIS FESETTE
Appearing in Samuel Goldwyn's "The Best Years of Our Lives" . . . an RKO Radio Release.

The Uniform High-Quality of Smith L-O Core Oil Pays Out

Right down the line — from core room to shake out — Smith L-O Core Oil does a better job . . . saves time, effort, money!

With this uniform, high-quality core oil used on jobbing and production work, you will find it prepares sand so that the number of run-outs is practically nil . . . cores hold their shape more accurately . . . castings come out cleaner to cut down machining costs.

The consistently dependable performance of this Smith L-O product is the reason some of America's foremost foundrymen use it exclusively. Yes, sir . . . you need only try Smith L-O Core Oil to know that it *really* pays out!

Smith L-O *Core Oil*

CORE WASH ROD DIP LIQUID PARTING

Smith L-O *Core Oil*

WAREHOUSE STOCKS AVAILABLE
In The Following Cities

- Foundry Service Co. Birmingham, Alabama
- E. R. Frost Co. Minneapolis, Minnesota
- Indiana Products Co., Inc. Kokomo, Indiana
- Frank C. Maley Detroit, Michigan
- William F. Rose, Tomkins Tidewater Terminal South Kearny, New Jersey
- Southwest Foundry Supply Co. Houston 7, Texas
- Malcolm G. Stevens Arlington, Mass.
- M. W. Warren Coke Co. St. Louis, Missouri
- Western Foundry Sand Co. Seattle, Washington
- Western Industrial Supply Co. Portland 14, Oregon

SMITH OIL & REFINING CO.
INDUSTRIAL OILS DIVISION . . . ROCKFORD, ILLINOIS

WE, TOO, ARE VICTIMS...

OF what? Of the same vicious circle that has you ensnared—shortages! And, ironically, in our case it's castings we need!

From foundrys we buy castings to make the molding machines we sell to foundrys. Despite our ceaseless efforts, we have not been able to obtain enough castings to permit meeting our conservative delivery promises. And, frankly, too many of the castings we do get must be rejected.

We are fully aware of your headaches! Coke and pig-iron shortages, inadequate labor—all take their toll. But don't lose sight of the fact that your ills are reflected as a tough situation for us. We're hindered in getting to you the machines that will help solve our mutual production problems. See what we mean? 'Round and 'round we go!

In an effort to regain balance, we have lengthened delivery dates on standing orders, and given shipping date promises on new orders that seem unreasonable to our customers. Bear with us. We've added to our facilities, so our production is increasing. Finally, the situation on castings shows signs of improvement. It looks better for all of us!

Certainly, with the vicious circle broken, all of us will soon be out from behind that eight-ball. And Tabor again can resume prompt service—so long a hall-mark of our name.

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, California; Gallagher Foundry Supply Company, San Francisco & Oakland, California; Carl F. Miller & Company, Seattle, Washington; M. W. Warren Coke Company, 1017 Olive St., St. Louis1, Mo.; E. R. Frost Co., Inc., Minneapolis 14, Minn.

MANUFACTURERS ASSOCIATION, INC. FOUNDRY EQUIPMENT

The TABOR Manufacturing Co.

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.

Beat Material Shortage Problems *by using* INEXPENSIVE

CASTFLUX
TRADE MARK REG.

The "National" Dual Purpose Flux IN YOUR LADLES

Get a higher percentage of SOUND CASTINGS. Reduce MISS RUNS.

Just Imagine! For only 6 to 10 cents per ton of metal treated you can effectively improve the quality of your metal. Many foundries using Castflux regularly in the ladle are now doing this in spite of the shortages of pig iron, quality coke and scrap.

Castflux offsets the negative factors created by inferior scrap and coke, because when used in the ladle, it acts as a deodorizing and purifying agent, removing occluded oxides and gases.

Castflux also brings quickly and surely to the surface any slag present, and dirt and foreign particles are also brought to the surface where they are readily skimmed. Castflux keeps molten iron and steel hot and fluid longer, thereby producing more sound and closer-grained castings.

To verify these statements give Castflux a fair trial, using as directed. Why chance losses and hampered production when Castflux will give you—better castings—even when you may be compelled to use metal that is not up to standard.

Castflux is sold on this

UNCONDITIONAL GUARANTEE

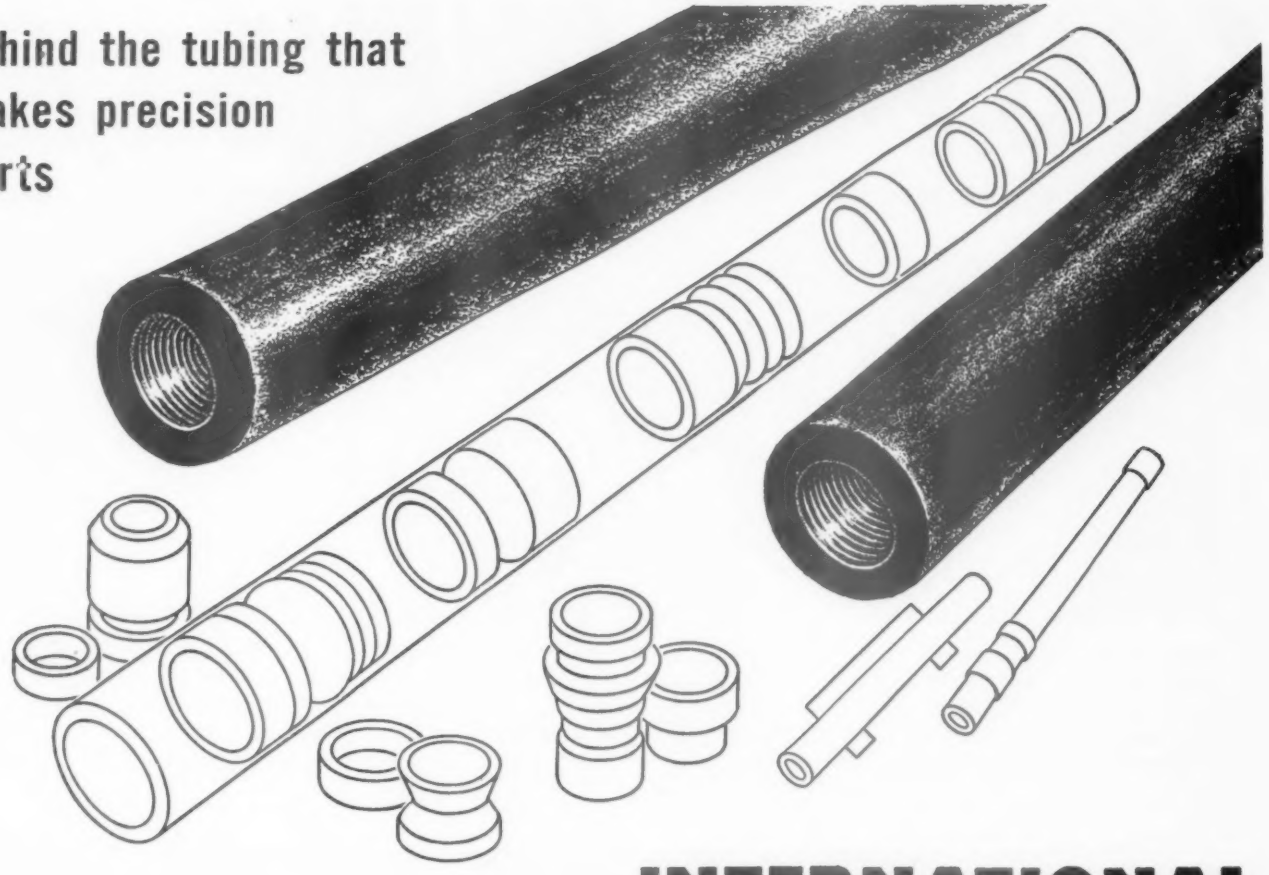
Use Castflux as directed. If it does not produce as claimed, material can be returned at no expense to yourself.

CASTFLUX
Is Equally Successful on both "BLIND" and "OPEN" TYPE RISERS

On castings made of steel, semi-steel alloy-steels and all types of high-test cast iron and grey iron. Properly used, Castflux reduces percentage of rejects, and the re-melting of riser metal.

NATIONAL
PIGMENT CO.
2115-2117 EAST YORK STREET
PHILADELPHIA 25, PA.

behind the tubing that makes precision parts



INTERNATIONAL GRAPHITE ELECTRODES

Makers of quality steel tubing know the importance of close production control. In the manufacture of mechanical tubing for precision parts, perfection in every production detail is imperative. For years, leading tube makers have been depending on International Graphite Electrodes as an important factor to electric steel quality. These manufacturers have proved to their satisfaction in the severest tests of all—in actual furnace operation under a wide range of requirements—that International Graphite Electrodes offer physical, electrical, and chemical properties in the combination they most desire.

Check over the qualities *you* want in electric furnace electrodes—the properties you'd see they had if you were *making* electrodes as well as *using* them. You'll find, too, that International Graphite Electrodes fully measure up to every exacting standard by which electrodes are judged.

For all around satisfaction and economical performance, specify International the next time you buy electrodes; find out first hand why they are so widely preferred by electric furnace operators. Write for details and prices today.

Specify INTERNATIONAL Electrodes for—Slow consumption—High current capacity—Low rate of oxidation—High thermal conductivity—High degree of purity—Consistently uniform properties and dimensions—Low cost per ton of production.

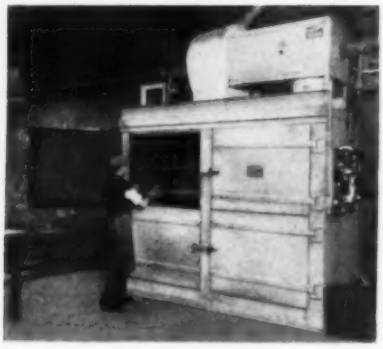
1591

ICE

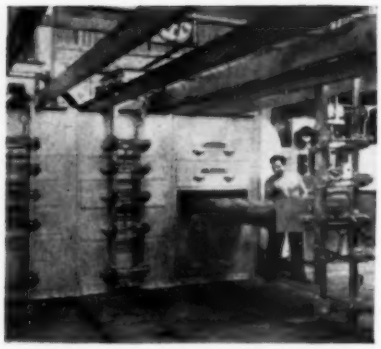
International Graphite & Electrode Corp.

SAINT MARYS, PA.

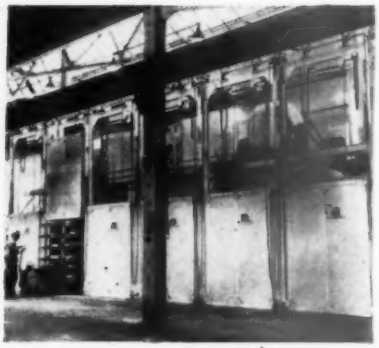
COLEMAN OVENS *Give*



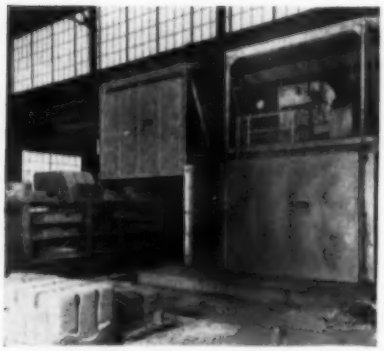
COLEMAN SHELF TYPE CORE OVENS. For limited production of small or medium cores. Available with gas or oil-fired recirculating heating systems.



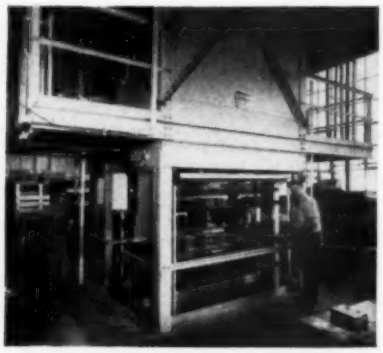
COLEMAN ROLLING DRAWER CORE OVENS. For larger production of small and medium cores. Available in a wide range of sizes and capacities.



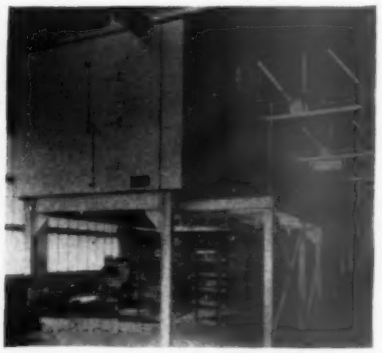
COLEMAN TRANSRACK CORE OVENS. For operation with portable racks to reduce handling. Single or multiple rack capacity per compartment.



COLEMAN CAR TYPE OVENS. For baking large cores or drying molds. Most of the large core and mold ovens in operation in every class of foundry production are Coleman Car Type Ovens.



COLEMAN TOWER CORE OVENS. For high speed production at lowest labor cost. Patented Center Passageway permits loading from inside and outside the Tower to provide maximum accessibility and loading speed.



COLEMAN HORIZ. OVERHEAD CONVEYOR CORE OVENS. For production departments employing large number of coremakers on such work as automotive, agricultural, etc., this design offers certain special advantages.

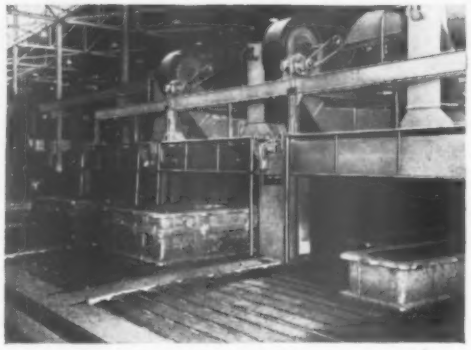
World's Oldest and Largest Foundry

The **FOUNDRY EQUIPMENT**

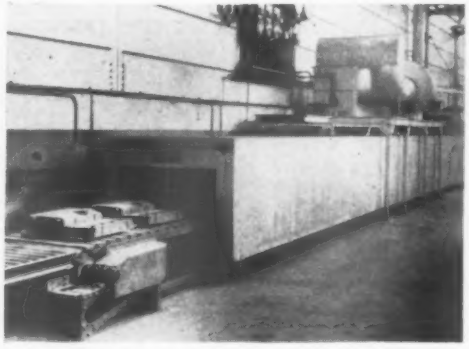
CLEVELAND 13, OHIO, U. S. A.

BUILDERS OF COLEMAN AND SWARTWOUT

Every Job the Right Start



COLEMAN CONVEYOR MOLD OVENS. For high speed continuous drying of molds. These ovens have revolutionized mold drying practice, giving amazingly increased production speed at a fraction of the cost of former methods.



COLEMAN FLIGHT CONVEYOR OVENS. For redrying cores and core assemblies after pasting, blacking or washing. These high speed ovens are available in range of sizes and capacities to suit all requirements.

GOOD CASTINGS DEMAND GOOD CORES

Coleman Ovens eliminate all core baking uncertainties. They remove the many variables in core baking that are responsible for a large percentage of casting rejects due to improperly baked cores.

Profit by Coleman know-how! Coleman oven engineers offer a background of greatest experience—more than 40 years of continuous specialization in the ***foundry oven field*** and a record of more than 9,000 successful installations in all classes of foundry production.

Coleman Ovens quickly pay for themselves through labor savings in the elimination of unnecessary losses. Increased production, lower fuel costs and improved working conditions are further advantages.

Coleman Ovens are built in all conventional types and sizes as well as specially engineered installations to meet each and every operating requirement.

Perfect baking is guaranteed with all fuels. Coleman Ovens may be operated with any "automatic" fuel such as gas, oil, electricity, powdered or stoker coal, etc., whichever is most economical to obtain in your district.

Write for Folio of Bulletins

ry Oven Specialists!

T Company

MEMBER

OVENS

COLEMAN
CORE and MOLD
OVENS

ENGINEERING ABILITY

DSM

BACKED BY 30 YEARS OF EXPERIENCE

DETROIT SHEET METAL WORKS

DETROIT, MICH. U.S.A.

EXPERIENCE and ability acquired in thousands of installations are at your service when selecting D.S.M. equipment.

D.S.M. case histories have been derived from equipment furnished to plants throughout U.S.A. and to Dagenham, England; Clichy, France; Bombay, India; Batavia, D. E. I.; Sao Paula, S. A.; Turin, Italy; etc. D.S.M. equipment means rapid cross flow circulation for speedy and uniform drying or baking. This eliminates case hardened products.

If you wish to convert your present system to the new postwar economy, it will be to your advantage to try our Go-Out Plan. This means that you will enjoy the services of our highly experienced engineers, who will personally inspect your system and work together with the various departments in your plant in need of special help. Their recommendations for whatever new installations may be required will place you in a position to secure a layout that will more than justify your outlay.

DETROIT SHEET METAL WORKS, 1270 OAKMAN BLVD., DETROIT 6, MICHIGAN

PLANT ENGINEERING: *Consulting assistance in plant layout to coordinate departmental operations, our experience dated from 1917 in this field.*

Such plant layout may be based on increasing production beyond present capacity, or it may be a rearrangement in this post-war period when operations are conducted under a new set of conditions.

MOTOR CLEANING EQUIPMENT: *Washing machines for cleaning tear-downs. Kerosene spray or similar solvent usually used as the cleaning medium.*

FORMED COWLINGS, PANELS, ETC.: *To your specifications, and of light metal alloys as required. Weldments and brazed assemblies may be under controlled atmosphere.*

PILOT EQUIPMENT: *Sample size equipment for development of heavy equipment.*

VERTICAL CORE BAKING OVENS • CONTINUOUS HORIZONTAL BAKING OVENS • BATCH TYPE CABINET OVENS • DRAWER OVENS

DETROIT SHEET METAL WORKS

DETROIT -6- MICHIGAN

Proof of performance lies in repeat orders — and 3 Hough Payloaders in one foundry mean that a Payloader pays off in dollars saved — in time saved — in labor saved.

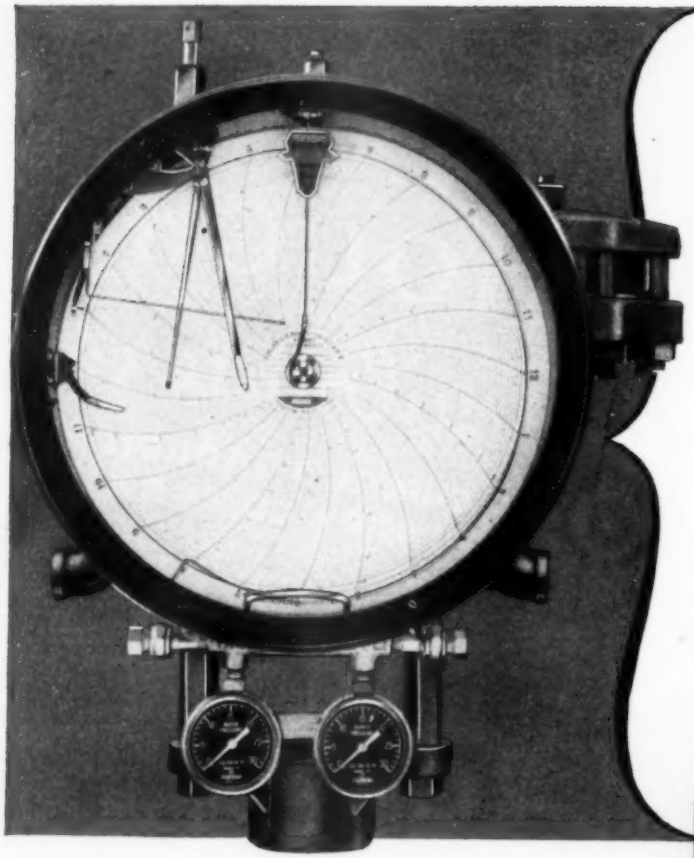
Progressive foundries throughout the nation are cutting corners on material handling costs — beating the labor shortage — increasing tonnage and profits with Hough Payloaders. A husky little Payloader can step into your foundry too and effect remarkable economies in handling core and moulding sand, clean-up work, yard maintenance and scores of other costly laborious jobs.

Hough Payloaders are based on over 25 years of material handling engineering experience, and backed by a world-wide distributor organization. It will pay you to get complete details on the 10½ cu. ft. Model HA, or the 1 yd. Model HL.

complete details and specifications available in these new catalogs.

OVER 6500 NOW SERVING INDUSTRY THE WORLD OVER

THE FRANK G. HOUGH CO.
MATERIAL HANDLING EQUIPMENT SINCE 1920
703 SUNNYSIDE AVE. LIBERTYVILLE, ILLINOIS



You'll get Better Heats IF You Weigh Air Too . .

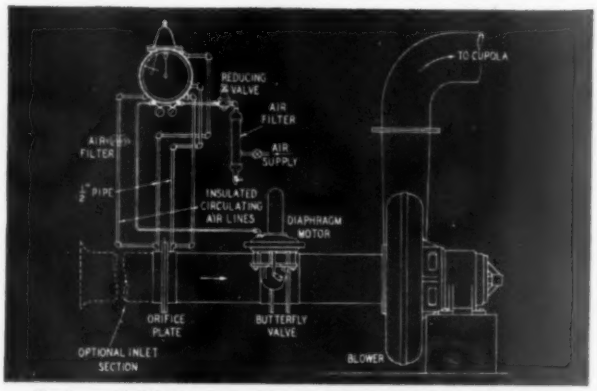
Simple Foxboro Air-Weight Controller installations like this, increase output per cupola by ½ to 1 ton daily.

BETTER HEATS, higher pouring temperatures, uniform melting conditions, and a lot of other advantages have been directly traced to the control of air *by weight* in the cupola.

This is easy to understand, if you stop to consider that the weight of oxygen consumed, rather than apparent air volume, is the prime factor in producing uniform cupola conditions.

With Foxboro Air-Weight Controllers which automatically control the weight of air, you don't have to worry about cold iron, or pigging or oxidizing of iron, when the weather changes . . . or when air blast temperature varies. Check this with any of the hundreds of foundries where Foxboro Air-Weight Controllers have been installed. You'll find that the most efficient and economical conditions have become their standard operating conditions.

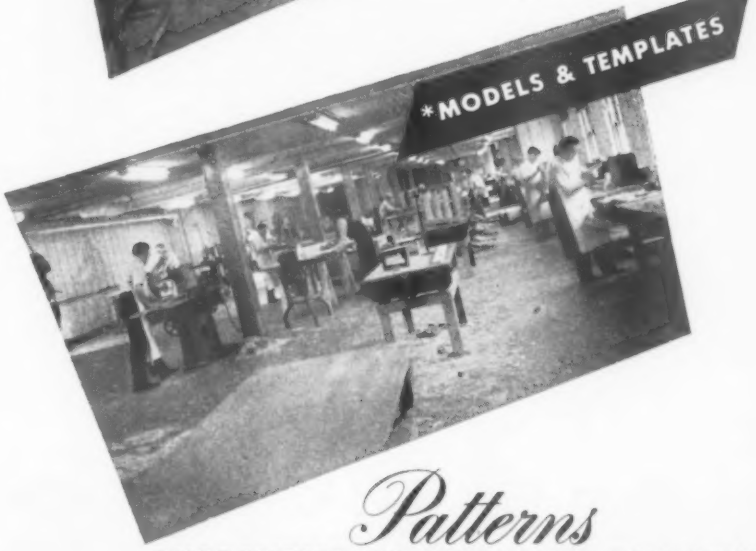
Write for Bulletin 268-2 containing full details of this easily-installed production booster. Ask for names of users in your vicinity. **The Foxboro Company, 32 Neponset Avenue, Foxboro, Mass., U. S. A.** Branches in principal cities.



Foxboro Air-Weight Controller is easily adapted to positive displacement blower, or to centrifugal blower (as in diagram above.)

FOXBORO REG. U. S. PAT. OFF. **AIR-WEIGHT CONTROLLERS**

HOWARD *your best source for:*



Take a look at these facilities for wood and metal pattern making and compare them with any other source you may have. This modern equipment plus a staff of over 150 skilled patternmakers is the reason for so many foundries and manufacturers specifying "Patterns by Howard."

From orders for one pattern to those for several duplicates, no detail is overlooked to see that each job measures up to every specification and reaches your foundry on time.

Complete pattern engineering service is available. Just call or send your print.

****Models and templates,*** *too, are another specialty with Howard. A complete shop is devoted entirely to their production which is serving many industries.*

HOWARD PATTERN COMPANY
1700 N. Kostner Ave., Chicago 39, Ill.

Patterns
GUARANTEED TO SUIT YOUR FOUNDRY by

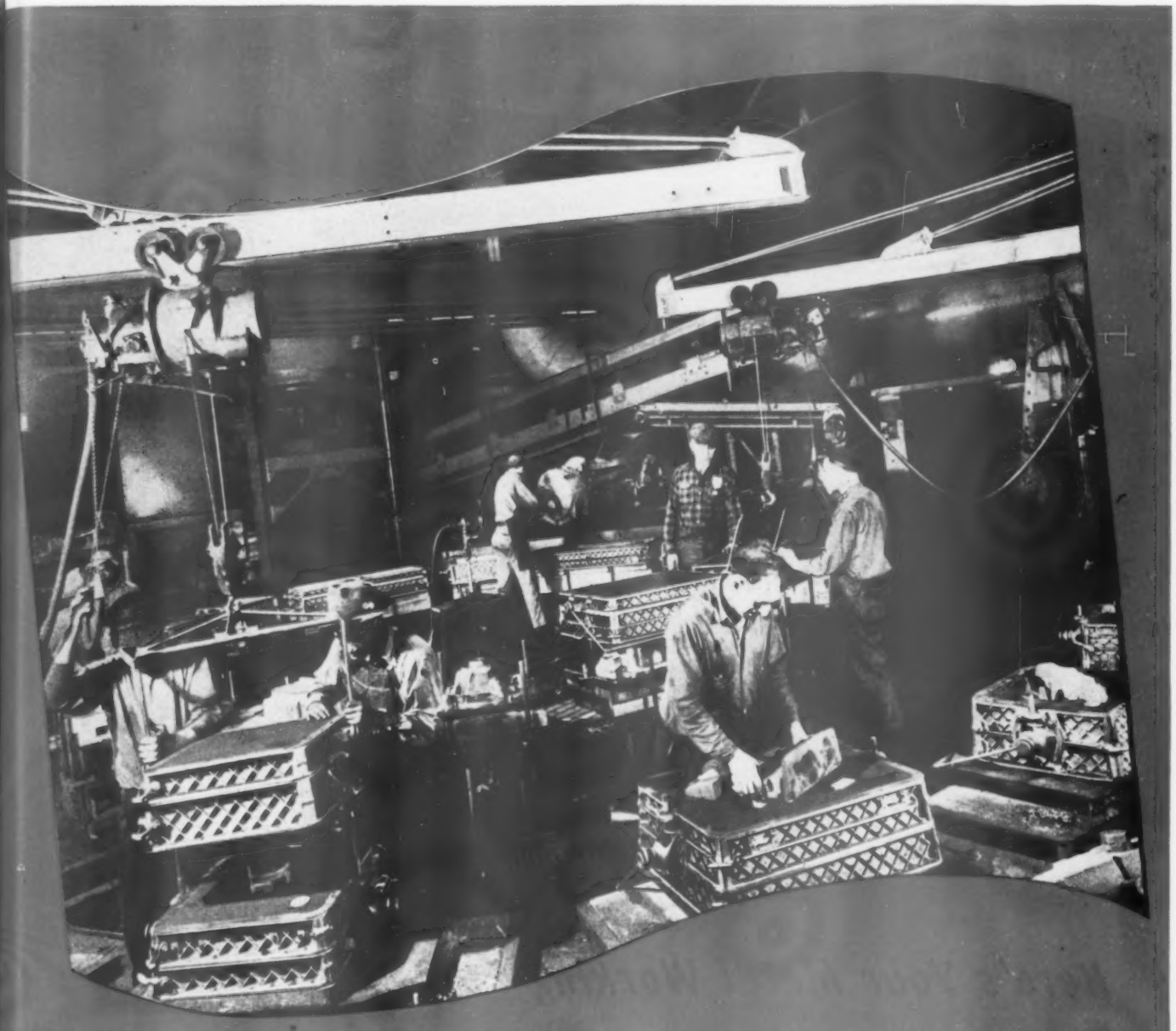
HOWARD

It's another highly mechanized foundry...

"THE PERFECT FLASK EQUIPMENT FOR USE WITH SAND SLINGERS"

THE HINES

3431 WEST 140th ST.



and they're equipped 100% with

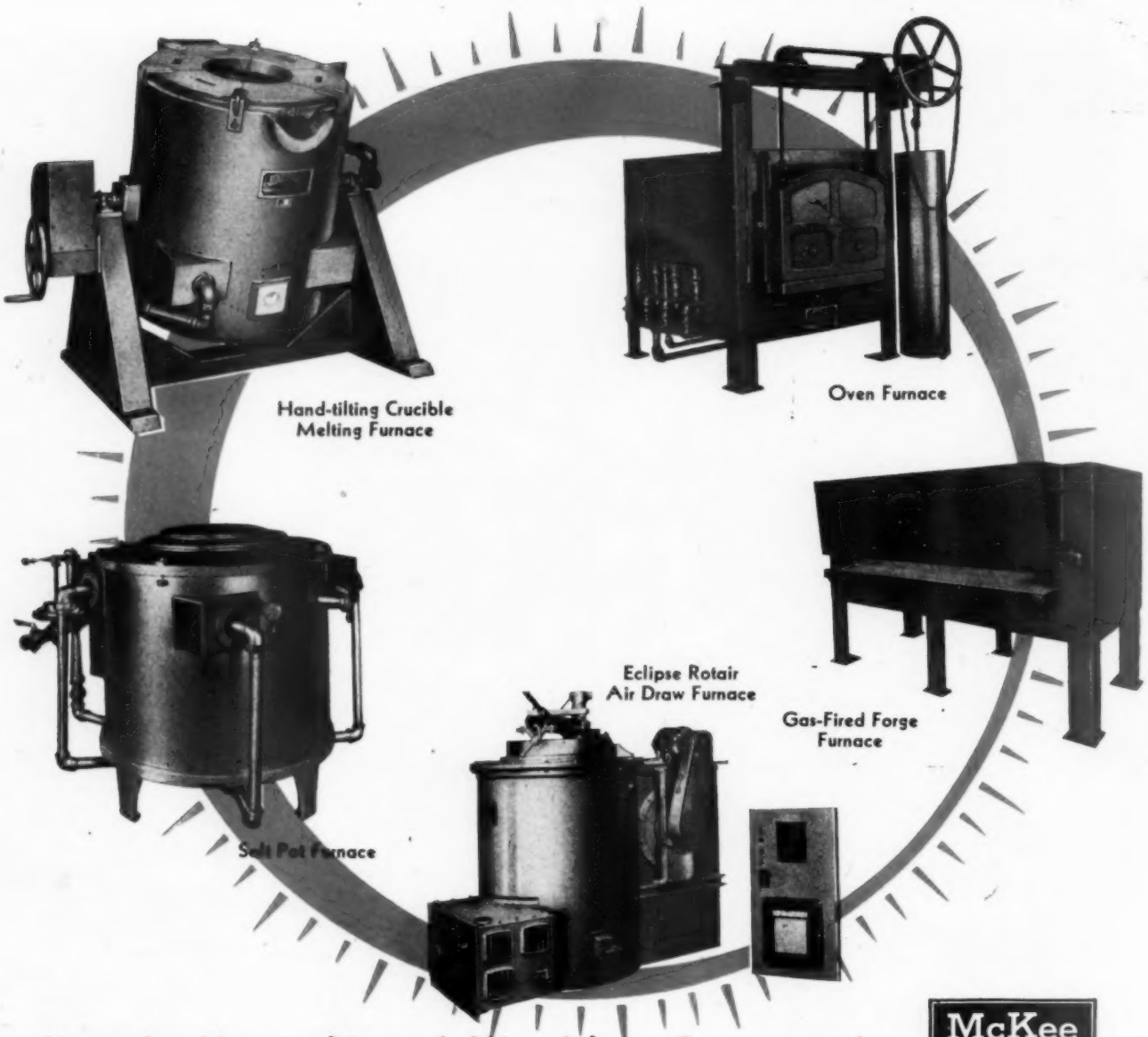
HINES *"Pop-Off"* FLASKS

TRADEMARK

Fully Protected by U. S. and Foreign Patents

S FLASK CO.

CLEVELAND 11, OHIO



Here's Your Metal Working Furnace!-

McKee Eclipse

Pot furnaces for drawing, case hardening, lead hardening and brazing of small parts . . . heavy-duty forge furnaces . . . gas-fired oven furnaces for tempering, bluing, normalizing, annealing, carburizing and hardening of carbon and high-speed steel . . . Rotair air draw furnaces . . . hand-tilting crucible furnaces for melting of non-ferrous alloys, red and yellow brass, bronze, aluminum.

Whatever your furnace requirements, we can meet them. And the "know-how" of our more than forty years experience is at your service! Write for free bulletins.

Representatives in all principal cities. Eclipse Fuel Engineering Company, 725 South Main Street, Rockford, Illinois.

McKee Eclipse

ECLIPSE FUEL ENGINEERING COMPANY

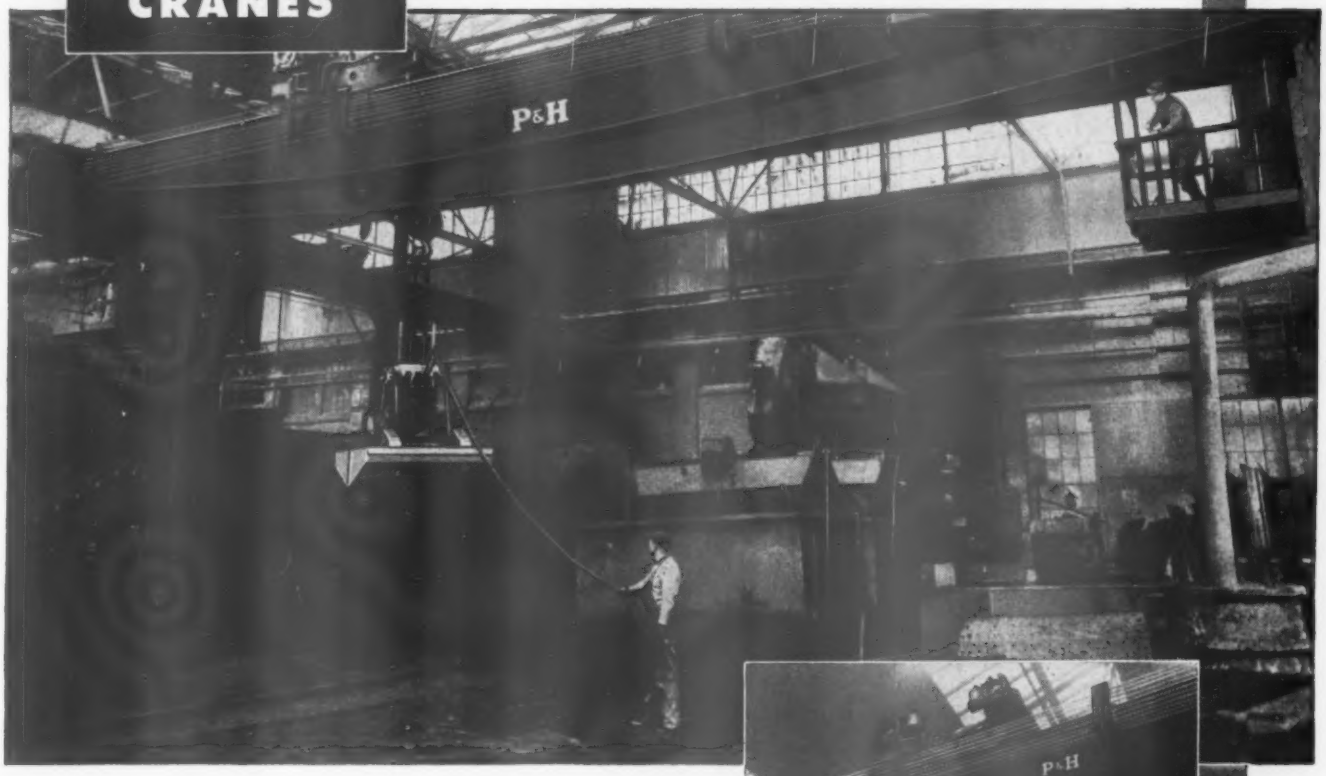
Metal Melting Equipment — Salt and Lead Pot Furnaces — Air Draw Furnaces — Forge Furnaces — Solution Heaters — McKee Centrifugal Blowers.

If it's for Gas—buy Eclipse

Walltite Burners—Proportional Mixers — Control Valves and Safety Shut-off Valves.

P&H FOUNDRY CRANES

...Added Values mean Extra Protection and Strength!



P&H Cranes are built to meet the severe operating conditions of the foundry. They have added safeguards and reserves of strength at every point of stress and wear. Smoother, steadier, faster service is assured by such Added Values as these:

Totally enclosed motors, sealed bearings and encased gears . . . P&H Cranes are indifferent to foundry dust, heat and fumes.

End trucks of true Master Car Builders' design . . . full 90° notches and all-welded box constructions for easier servicing.

Heavy duty trolley operating through oversize electrical equipment and mounted on husky bridge . . . all to withstand the heavy lifting at the casting floor, the shock loads of the shake-out, the speeds of stock piling.

P&H Cranes provide the easy and accurate control you want, too. Especially with P&H front lever, full-vision cabs, operators can close molds gently, empty ladles minutes faster. Have our representative explain in detail why P&H is America's leading builder of foundry cranes.

P&H SINGLE LINE GRAB BUCKETS

for foundries are a great time and labor saver. Not only do they work fast, bite deep and pick up clean, but they can be attached to the crane hook in seconds. Thus there's no reason for using skilled hands even on the smaller jobs of sand and refuse handling, flask filling, etc. Write for Bulletin C-27.

P&H

ELECTRIC OVERHEAD CRANES

4405 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

ELECTRIC CRANES • EXCAVATORS • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

...We Shook Out the Pickpocket's Dust Pockets

for $6000.00 and more

In the plant shown here, 25 tons of dust a day, produced from woodworking operations, could have formed dust pockets which would have ruined efficiency as well as created a hazard.

But — a Pangborn dust control system was installed to collect and dispose of the dust. As a result, the shop area "is remarkably clean and clear of dust". The wood waste, removed from the air, is deposited directly into storage hoppers for disposal. And, the air, after cleaning, *returns* to the working area, resulting in a saving in heating expense alone of about $6,000.00 a year.

A "Dust Pocket Survey" of *your* plant may reveal similar opportunities to turn dust losses into profits by removing dust (and *reclaiming* it, if it's valuable) from light-stealing, efficiency-reducing, maintenance-increasing dust pockets. Such a survey — by experienced Pangborn engineers — costs nothing. And ask for free 28-page Bulletin 909A, giving complete story on Pangborn equipment which has successfully solved dust problems in over 9000 installations. Address Pangborn, *world's largest manufacturer of dust control and blast cleaning equipment* at 300 Pangborn Boulevard, Hagerstown, Maryland.

Pangborn
DUST CONTROL
PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

TURNS DUST LOSSES INTO PROFITS

THIS NAME

IS YOUR GUARANTEE OF *Quality*

Silverstein and Pinsof
INCORPORATED
1720 ELSTON AVENUE CHICAGO 22, ILLINOIS

BRASS · BRONZE · ALUMINUM · LEAD · TIN · SOLDER · TYPE METALS · BABBITT · ZINC BASE ALLOYS

Bindarene

USED IN GOOD FOUNDRY PRACTICE FOR 38 YEARS

FOR FOUNDRY CORES FACINGS AND SPRAYS

This is an organic core binder suitable for working alone or as a partial substitute for oil.

BINDARENE

- SAVES BINDER COSTS.
- ASSURES FREE AND COMPLETE RUNNING OF CORES.
- REQUIRES LESS VENTING OF CORES.
- WELL ADAPTED TO LIGHT AND HEAVY WORK.
- MODERATELY PRICED.
- TIME TESTED FOR 38 YEARS.
- HAS CONTINUOUS ACCEPTANCE IN FOUNDRY PRACTICE.

BINDARENE IPCO CORE BINDER

Correspondence invited with foundry supply houses and makers of foundry compounds.

INTERNATIONAL PAPER COMPANY

BINDARENE SALES DEPARTMENT

220 East 42nd Street, New York 17, N. Y.

FOUNDRY IMPROVEMENT with "Fishers"

Fisher Crucible Furnaces are widely used where quality castings, low scrap loss and low metal loss are a necessity. Many Fisher users formerly melted brass, bronze, and aluminum in open flame type furnaces and are in a position to make a comparison. They report also that Fisher Crucible Furnaces brought about an improvement in working conditions.

The crucible furnace costs less to purchase, operate, and reline. Its dependability and flexibility offset any advantages of quick melting by other methods. Different metals can be melted merely by changing crucibles.

Metal specifications can be exactly controlled because metal loss of copper, tin, lead, and zinc can be held to within ¾% of the total charge. The deep metal bath surrounded by a crucible wall allows for more uniform heating and is protection against absorption of hydrogen, oxygen, and carbon monoxide which are present in furnace gases. The crucible furnace avoids the large surface exposure of metal present in an open flame furnace, which facilitates the absorption of gases and oxidation of the metal and results in larger scrap loss due to porosity.

We will gladly offer recommendations. Fisher engineering and layout services are available, as well as literature on all equipment.

Upper photograph shows Fisher hand tilting and stationary furnaces installed compactly in corner formerly used for storage of coke, kindling, etc. Rear charging platform with metal storage bins will be installed behind furnaces. Steel curtain and roof fans isolate all fumes from rest of foundry. Transfer ladle travels in front of furnaces on overhead trolley.

Lower photograph shows battery of 14 coke fired furnaces occupying middle of floor. Also seen are coke and wood storage, and chimney occupying space which will now be used for molding, pouring, and shakeout, increasing working floor space 25% without addition to building.

Photos Courtesy of Burlington Brass Works, Burlington, Wis.

5519 North Wolcott Avenue, Chicago 40, Illinois

Fisher FURNACE COMPANY

Engineers and Builders of Industrial Furnaces (Exclusively) Since 1906

We've Improved the

FOUNDRY GOGGLE

For Finer Fit
TWO SIZES
For Greater Comfort
A CORDUROY MASK BINDING

The A-O 305-50 (NFA) Foundry Goggle is now available in two sizes, #305 regular standard mask and #307, a smaller mask. Regular mask fits large faces and the small mask fits smaller faces. A corduroy binding extends around the entire edge of the soft leather mask for extra comfort and tight fit. 1-piece headband is easily adjustable. Wire screen ventilators around eyecups provide extra large area of ventilation. Sparks and flying objects cannot reach eyes. Available with Super Armorplate or 6 Curve Super Armorplate clear or calobar lenses in medium, dark or extra shades. Recommended for protection in such foundry work as melting, pouring, chipping, grinding, babbitting, riveting, hand tool operations and machine operations. Your nearest A-O Representative can supply you.

Safety Division American Optical COMPANY

SOUTHBRIDGE, MASSACHUSETTS. BRANCHES IN PRINCIPAL CITIES

BETTER GRINDING... FASTER GRINDING... WITH STERLING CHUCKS AND SEGMENTS

Sterling No. 2 Chucks and Segments combine solid grinding wheel efficiency with all the cooler-grinding advantages of theoretical clearance. Sterling segments are identical throughout—provide the same high quality grinding after long use as when first started on the job. Adaptable to a wide variety of machines using 8" to 20" cylinder wheels, they have been tested and approved by workers and foremen of grinding departments everywhere.

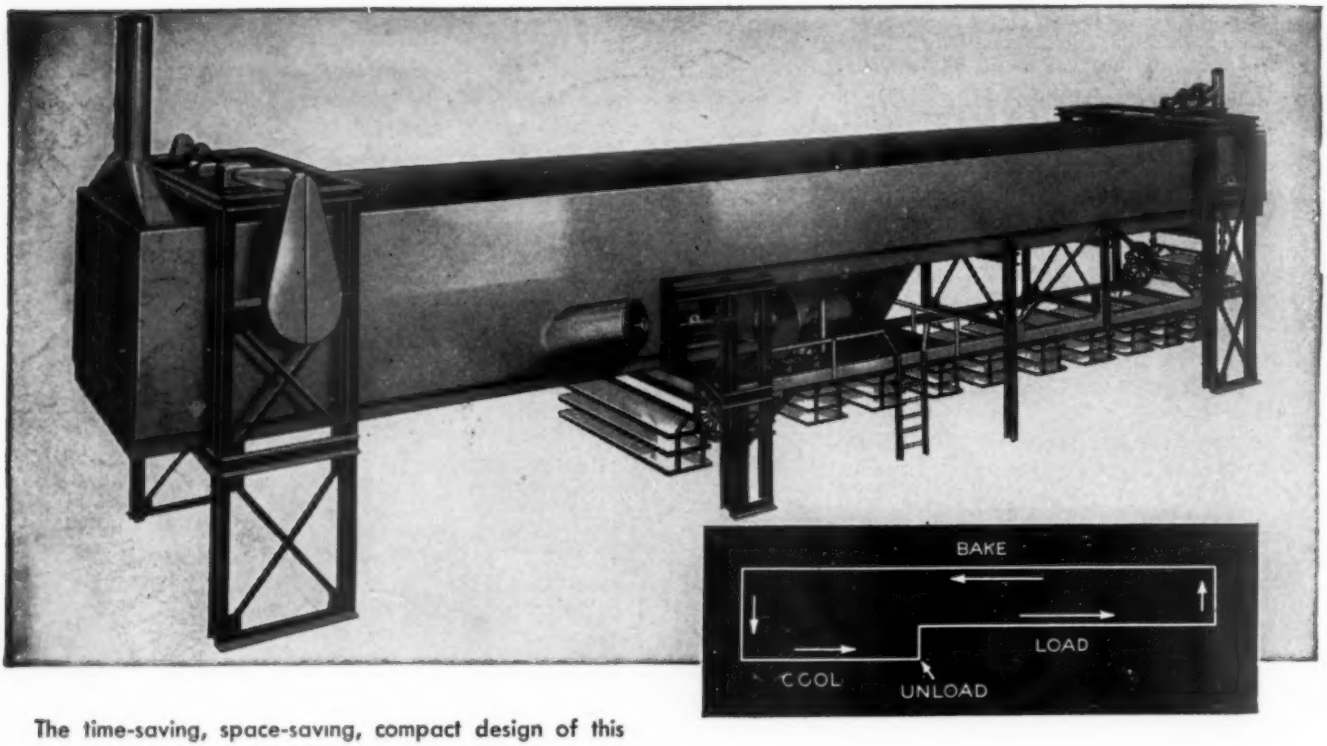
Sterling
"THE WHEELS OF INDUSTRY"
INTERLOCKING DESIGN MEANS ADDED STRENGTH
RETAINING BAND FOR EXTRA STRENGTH
CHUCK MAINTAINS INDIVIDUAL GRIP AS SEGMENT WEARS DOWN
LIGHT WEIGHT CHUCK-EASY ON BEARINGS
CURVED EDGE PROMOTES CONTINUOUS SHEARING ACTION
SPACE BETWEEN SEGMENTS FOR COOLER GRINDING

Speed up your surface grinding by using Sterling segments! They form an abrasive ring that provides grinding efficiency every second they are in operation. Have a Sterling engineer demonstrate them in your plant and see for yourself what they can accomplish.

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY



New HORIZONTAL CORE OVEN . . . . . offers many cost saving advantages!

The time-saving, space-saving, compact design of this new Horizontal Core Oven is characteristic of Young Brothers' Engineering. Into it went the skill and confidence of many years of experience . . . also a thorough knowledge of the job to be done and the production problems involved.

This new core oven can be installed in practically any building without making any major structural changes.

The coremakers are located right next to the oven so that they can load the cores directly on the moving racks thus eliminating the necessity of transporting them on hand trucks or a conveyor from the core room. The location of the coremakers, at the oven, also saves core room space.

The size of the loading racks can be varied and the shelves can be adjusted to accommodate cores of many sizes and shapes.

Besides allowing for the removal of exhaust gases at the point of greatest concentration, the new oven design provides an effective cooling zone for the cores and assures comfortable working conditions for the coremakers.

This New Horizontal Core Oven is Young Brothers' answer to the demand for better core baking equipment. It is YOUR answer to the need for lower production costs and higher operating efficiency.

MEMBER FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC.

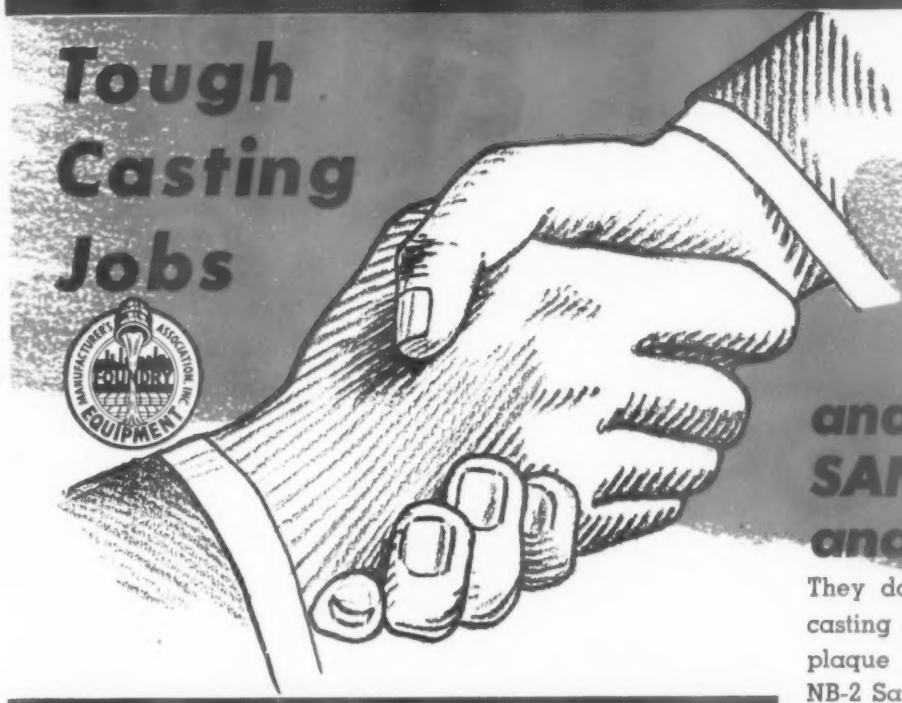
YOUNG BROTHERS COMPANY

6508 MACK AVENUE DETROIT 7, MICHIGAN

YB CO

ESTABLISHED IN 1896

HAND IN HAND . . . .



and the ROYER SAND SEPARATOR and BLENDER

They don't come any tougher than the casting of the 88" by 66", 900-lb., bronze plaque shown at left — a Royer Model NB-2 Sand Separator and Blender played its part in assuring perfection in every detail. When sand HAS to be right — the foundryman's praise for the Royer reaches new heights.

This huge plaque was cast by the Wagner Brass Foundry, Inc., Chicago, Ill. Less than five minutes from furnace to completion—5 men, each with a crucible, poured on signal. The metal flowed in over the outside ornament to the center which is only ¼ inch thick. The sand carefully prepared on the Royer assured smooth flowing of the metal, smooth casting finish, sharp detail in ornament and lettering.

The Royer removes trash, breaks up lumps and clay balls, blends, distributes moisture evenly, increases permeability 10 to 20 points, double aerates. Many models available: portable or stationary with capacities from 4 to 50 tons. Send for Bulletin 744—find out about this cost-saving, quality-improving sand conditioner.

ROYER

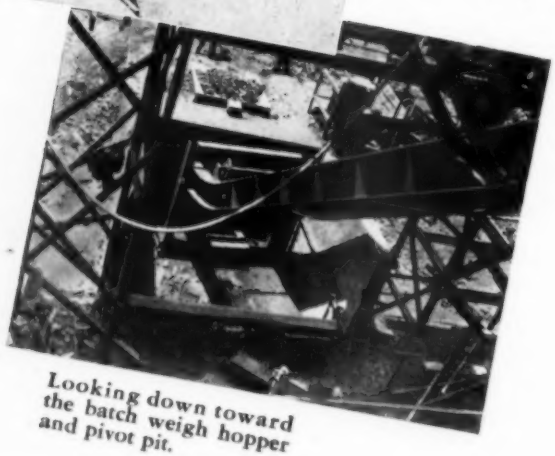
FOREMOST IN SAND CONDITIONING EQUIPMENT

ROYER FOUNDRY & MACHINE CO.
KINGSTON, PENNSYLVANIA

WHITING

SWIVEL CHARGERS

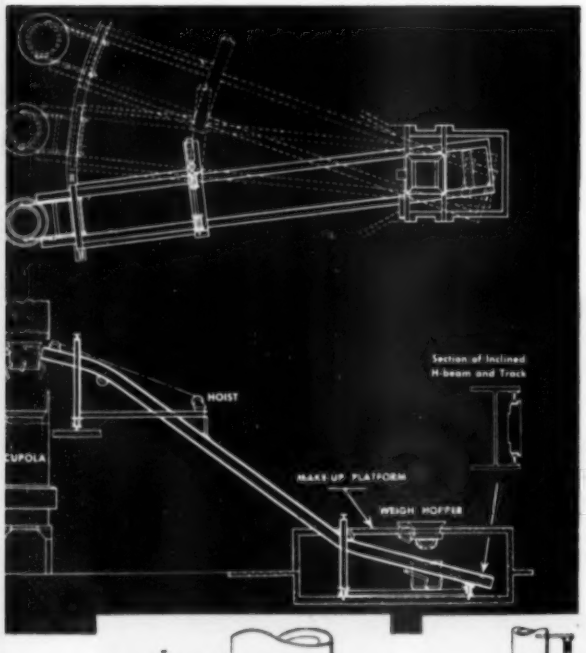
The hoist drive (top) as seen from the charging door level.



Looking down toward the batch weigh hopper and pivot pit.

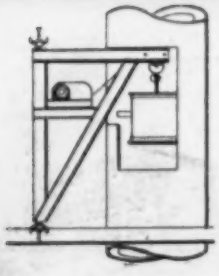
The Whiting Swivel Charger is an inclined skip hoist that is pivoted at the lower end, and designed so that the upper end swings on a semi-circular track to serve two, three, or four cupolas. Shifting from one cupola to another may be either hand or electric powered; and when motor powered, the push button control can be provided with an ingenious automatic indexing arrangement.

Buckets may be of the cone bottom type, or have single leaf or double leaf drop bottoms, as circumstances may dictate.

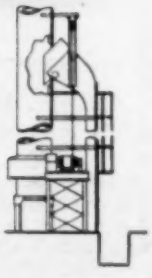


Showing how the Whiting Swivel Charger serves multiple cupolas.

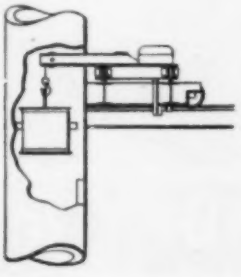
Empty bucket descending. Drop bottom leaf has just reached the automatic closing mechanism.



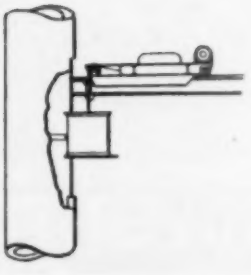
Jib crane type charger



Vertical side-dump skip charger

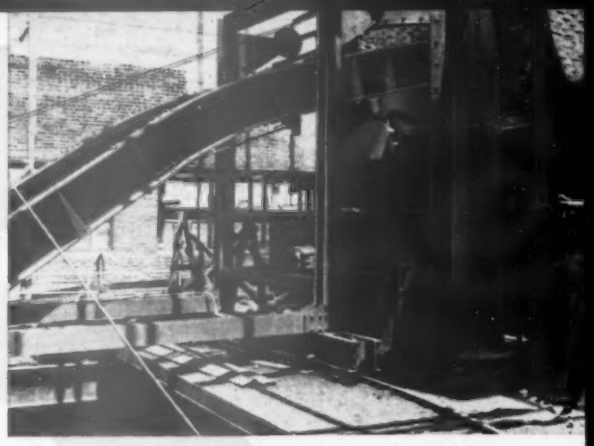


Overhung crane type charger



Horseshoe crane type charger

rve 2 or more cupolas



Semi-circular track enables charger to serve two cupolas.

We invite your investigation of this equipment, as well as the many other types of Whiting Mechanical Chargers which are available. Our engineers will gladly consult with you and recommend equipment suitable to the needs of your particular operations.

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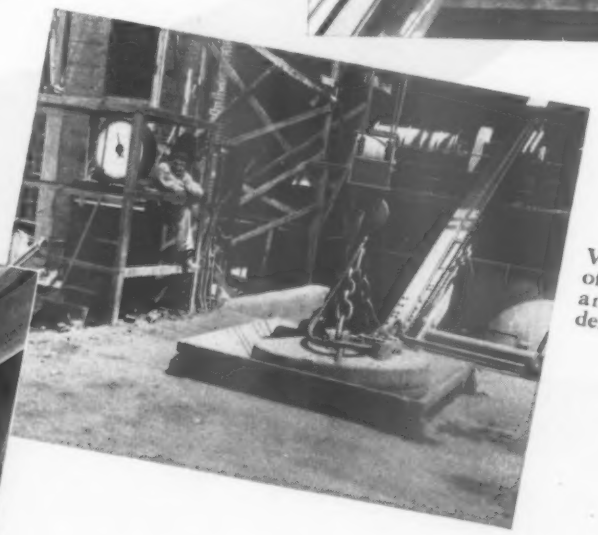
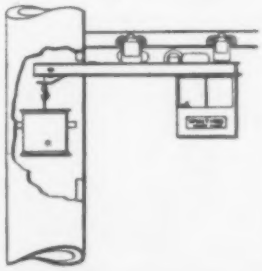
Looking up the incline. Note the double I-beam track construction.

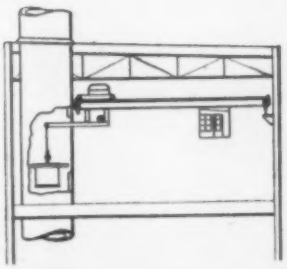


View showing top of weigh hopper and scale. Note descending bucket.

Drop bottom leaf closed. Note how lower end of track is mounted on turntable.



Monorail type charger



Underslung crane type charger

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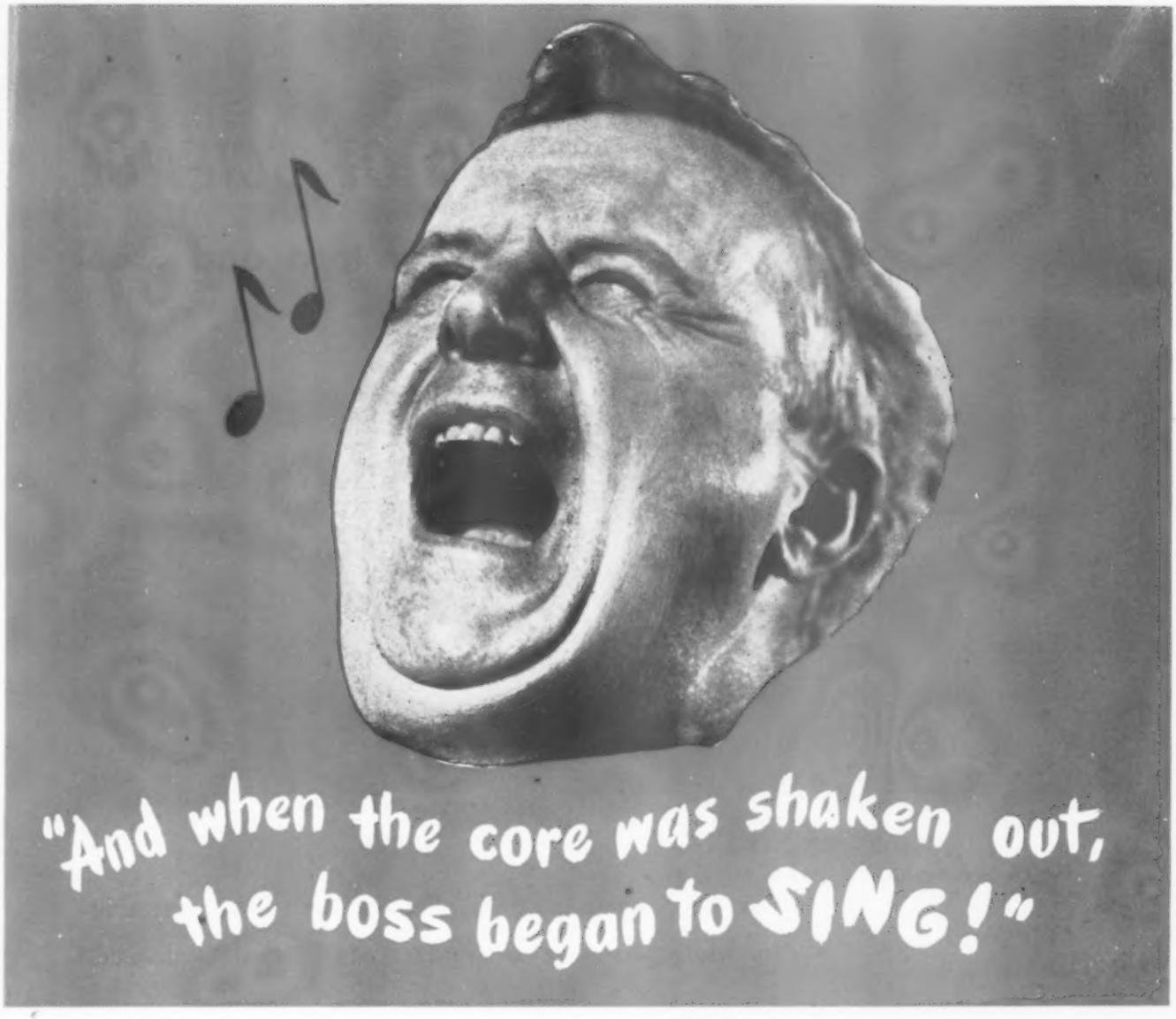

"NEVER saw cores behave so well before. From the time they were nothing but a pile of mix, their behavior has brought joy to the most critical coremaker. Plenty of green strength; better permeability; no sticking; and they collapse like a tired pup on a pillow. Look at these castings! They're smooth and sharp. The whole batch is dog-gone near perfect. And, believe me, that's the way to make core room costs toe the mark.

"We're using Krause Cereal Binders in our coremaking. Some like the lightweight — *TRUSCOR*, the Krause people call it; some like the heavyweight — *AMERIKOR*, by name. My core making troubles flew right out of the window when we started using Krause cereal binders, so I'll pass along a tip — make your choice either lightweight or heavyweight — but just be sure it's a Krause Cereal Binder."

We can't add much more to the boss' story except to remind you that on your next order, ask for Krause cereal binders — *TRUSCOR* for lightweight; *AMERIKOR* for heavyweight. And if you have a core problem that needs solving, phone, write or wire us the details. We'll be glad to help you.

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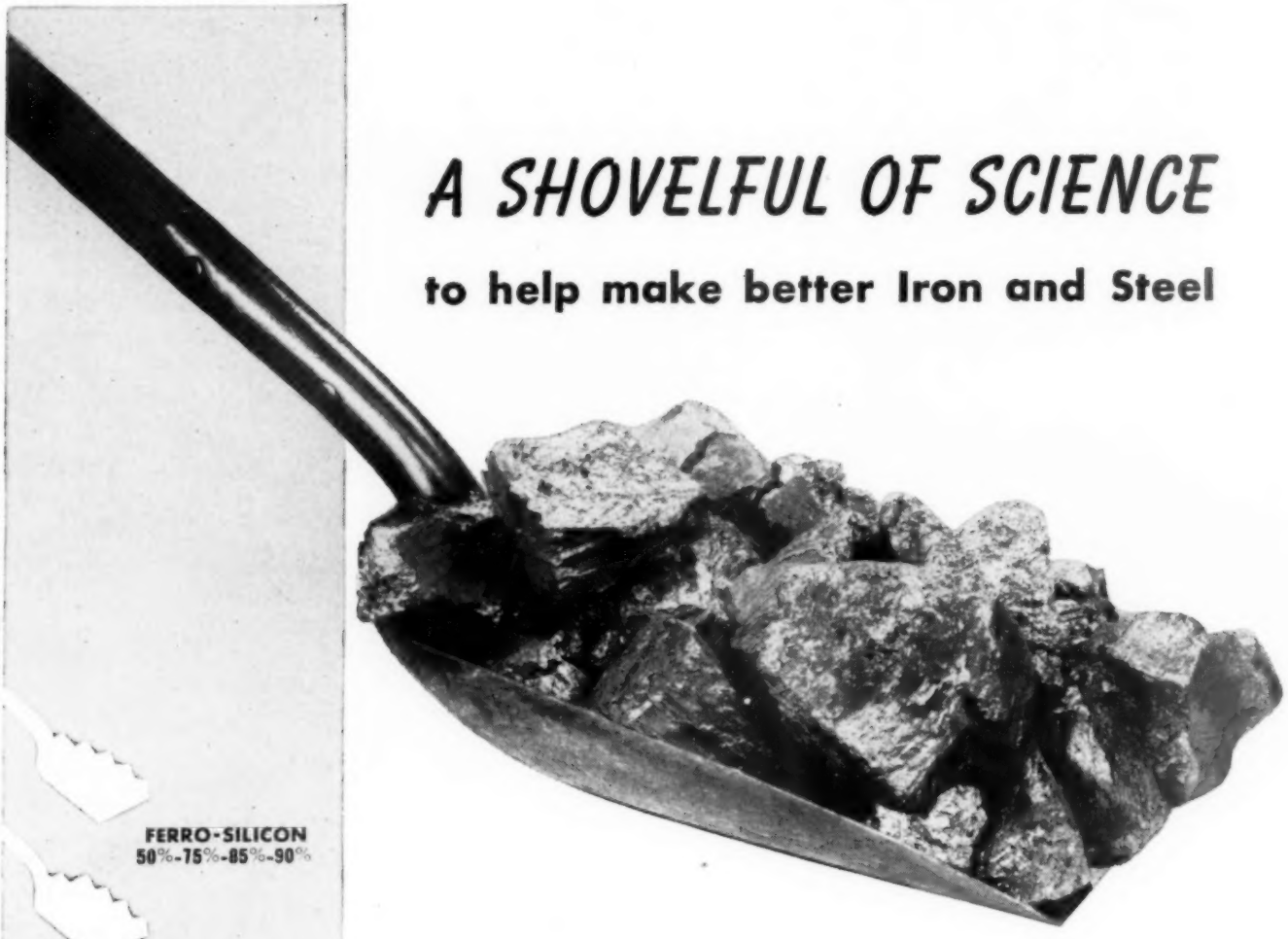
to help make better Iron and Steel



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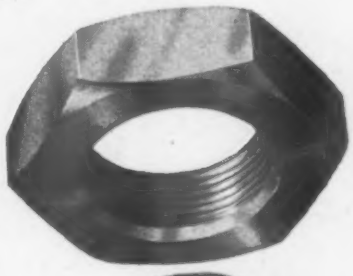
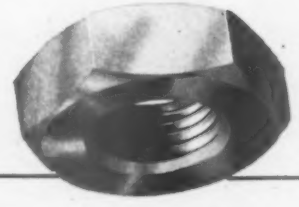
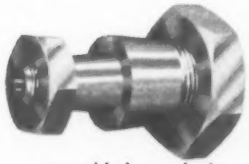
Get perfect Cope and Drag register — better castings — with UNIVERSAL FLASK PINS and BUSHINGS



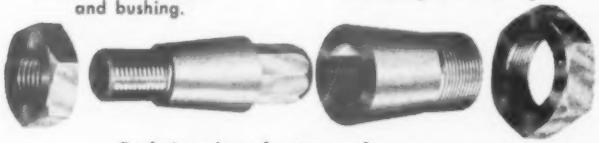


Only when cope and drag are perfectly lined up do you get the perfectly formed sand molds necessary to turn out true castings—and you can depend on perfect register of cope and drag once you accurately install Universal Standardized Flask Pins and Bushings. These modern accessories to good foundry practice are precision made, hardened, and ground for lasting accuracy. They anchor firmly with self-locking nuts to provide the positive stability vital to true register. Universal Standardized Flask Pins and Bushings are available for immediate delivery in several sizes of round, elongated, press fit and other standard types for use in cast iron, steel, and aluminum flasks. The pins and bushings illustrated are primarily for use in aluminum or magnesium flasks. Special types and sizes made to order. Write for complete information, and give us particulars of your requirements so we may make specific recommendations.



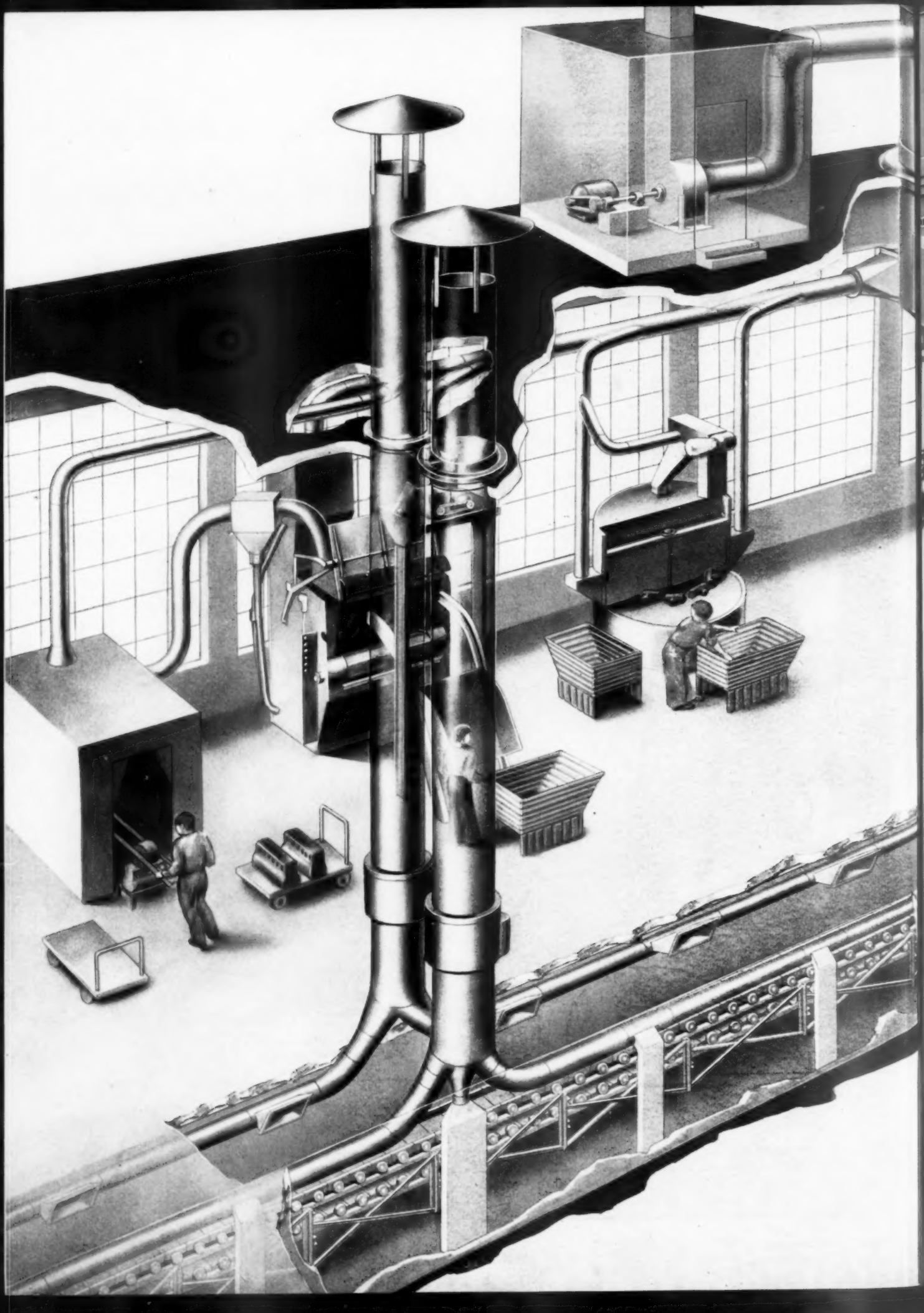
Assembled round pin and bushing.

Assembled octagon pin and elongated bushing.



Explosion view of octagon pin and elongated bushing.

UNIVERSAL ENGINEERING COMPANY • FRANKENMUTH, MICHIGAN



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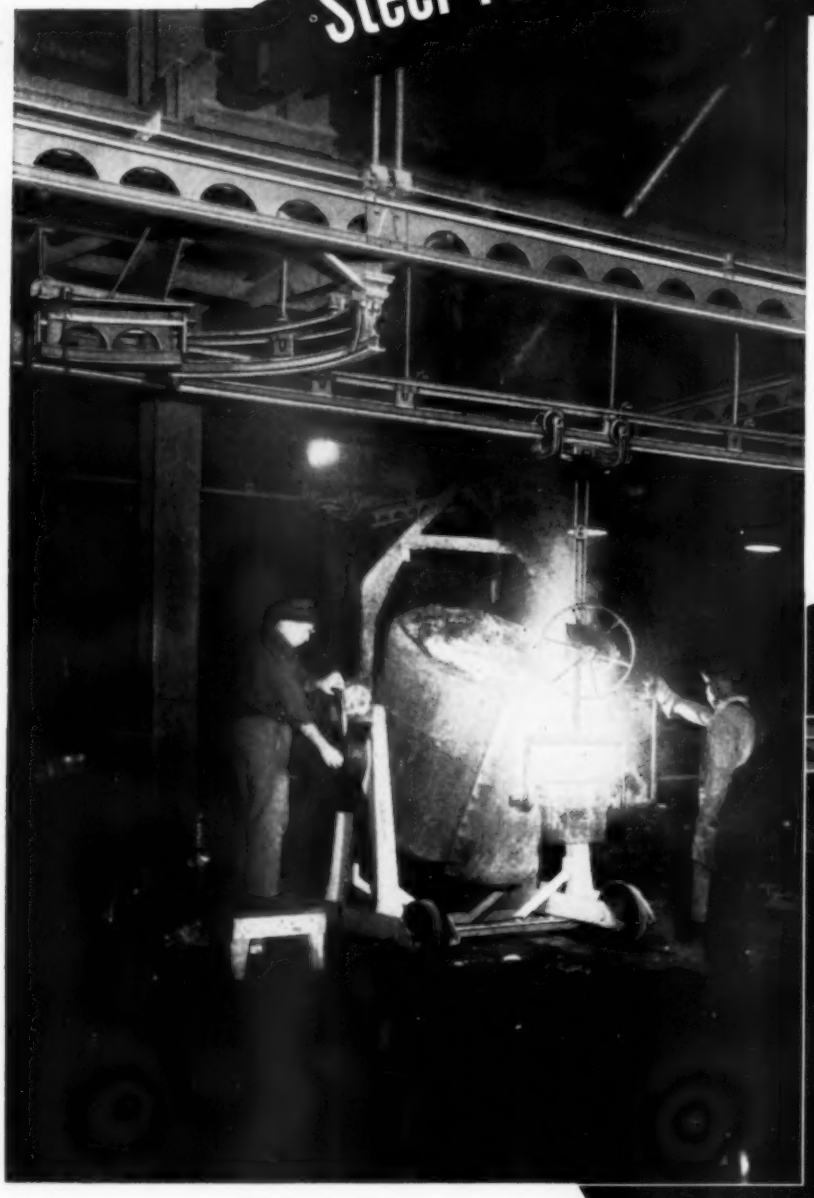
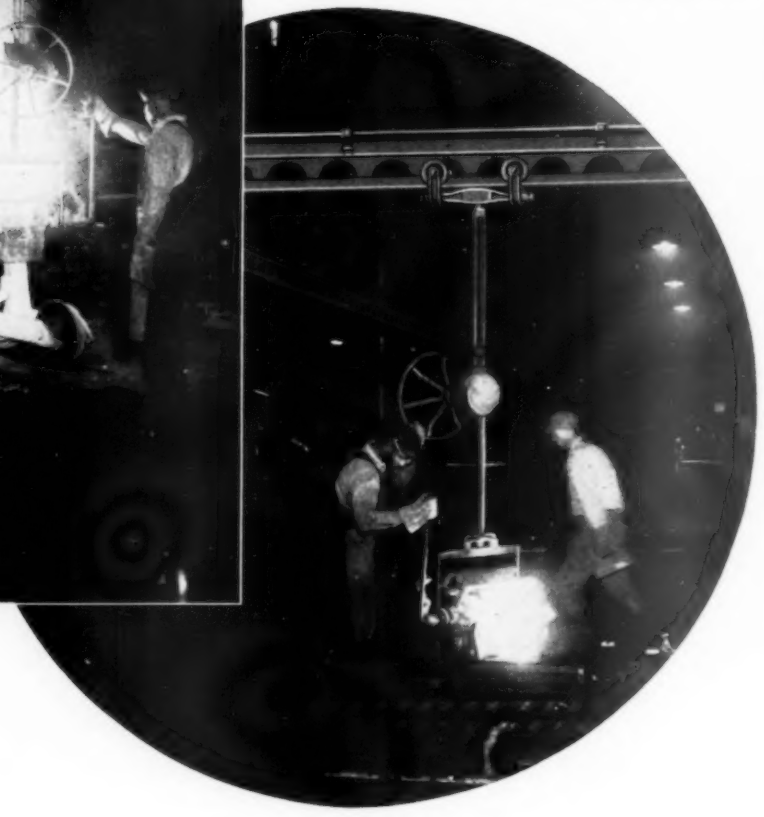


Not only has Cleveland Tramrail been an important factor in speeding production and lowering costs in a large Michigan steel foundry, but it has eased the work for the employees and aided their safety.

Because of the gratifying experience with the original equipment installed in 1936, more has been purchased every ensuing year. Today Cleveland Tramrail equipment provides handling coverage for the entire pouring floor, the large cleaning department, and will be found in every section of the plant.

This progressive foundry (name on request) is fully convinced of the many advantages that can be secured with Cleveland Tramrail equipment.



In nearly every instance, each of the many installations of Cleveland Tramrail at this foundry, paid for itself within the first six months of operation.

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OVERHEAD MATERIALS HANDLING EQUIPMENT

Modern Practice Needs More Widespread Use

ONCE again the members of the American Foundrymen's Association will stage an annual convention for the purpose of reviewing recent progress in the production of castings, and discussing future trends in the various activities of association committees.

The 1947 meeting will be held in Detroit, April 28, 29, 30 and May 1. Committees of the Detroit Chapter of the AFA will act as hosts, and have arranged some of the special features of the program. It is interesting to note in passing how history is repeating itself as the AFA gets under way on the second half century of co-operative effort within the foundry industry. Just 50 years ago the infant American Foundrymen's Association held its second annual convention in the city of Detroit. Since then the association has met there in 1910, 1926, 1932 and 1936.

Scope of the technical program, as presented on pages 84 to 87 this issue, and the excellent facilities provided by the plants in Detroit, for studying modern foundries in operation, assure a much greater attendance at the 1947 meeting than usually is accorded an annual convention without an exhibition.

Study of the tentative program indicates that association members and guests who attend the various meetings at Detroit and participate in the discussions, will be well paid for the time and effort expended. There has been continued progress in all phases of foundry practice and in the tools with which castings are made, and these developments and improvements undoubtedly will be reflected in the technical and practical discussions of the convention. Those taking part in the program or listening to the discussions should have a feeling of satisfaction over the greater knowledge that has been developed by the foundry industry.

Pride in accomplishment is splendid, but it must not blind the progressive casting producers to a pressing problem. Unless all foundries make good use of these gains in the knowledge of foundry practice, the industry cannot reap maximum benefits from the money that has been expended in co-operative research.

If reports frequently reaching the editor are true, some foundries are producing castings which are not of the quality permissible with the present advanced knowledge of foundry practice. Through carelessness or a complete disregard of modern production methods, these foundries are producing castings which are not satisfactory for intended applications. This results in a dissatisfied customer, whose criticisms usually expand to the point where they are directed against all castings.

As insurance against the competitive period which probably is not too far away, means must be found to get more companies to make use of the advanced knowledge of foundry practice that is discussed at meetings of the American Foundrymen's Association and other foundry organizations.

Frank G. Steinebach
Editor

Detroit Welcomes AFA

FOR the first time since 1936, the city of Detroit and the members of the Detroit Chapter will welcome the national gathering of the American Foundrymen's Association when the 51st annual convention of the society assembles in the Motor City, April 28 through May 1.

Although the biennial exhibit of foundry equipment and supplies will not be held this year, a wealth of technical information relating to all phases of foundry practice—including the most effective use of modern foundry equipment and supplies—is incorporated in the more than fifty papers scheduled for presentation during the four-day meeting.

The technical program, as detailed on the next four pages, will cover a wide range of subjects relating to the major divisions of the association, while a large number of subjects of general interest—including casting inspection, foundry costs, refractories, education and sand research—are equally well represented in the schedule of papers. Four sessions each are planned for the popular gray iron and sand shop courses. In addition a number of round table discussion sessions are scheduled for the more informal consideration of foundry production problems.

Registration headquarters for the convention will be maintained at both the Statler and Book-Cadillac Hotels where most of the technical sessions also will be held. Monday morning and afternoon sessions, however, are scheduled for the Rackham Educational Memorial; these include the opening general meeting Monday afternoon at 2 o'clock.

A highlight of the annual business session on Wednesday afternoon, April 30, will be the 1947 Charles Edgar Hoyt Annual Lecture. This will be delivered by Dr. James T. MacKenzie, chief metallurgist, American Cast Iron Pipe Co., Birmingham, on the subject, "The Cupola Furnace." This pre-

sentation will inaugurate a new AFA lectureship series, which has been established by a renaming of the society's foundation lecture, honoring C. E. Hoyt for his thirty years of highly valued service to the association and the foundry industry. Mr. Hoyt served as secretary-treasurer and chief executive officer of the association for years, and retired as AFA treasurer last Aug. 1. Dr. MacKenzie, an outstanding foundry chemist and metallurgist, is particularly well known for his many contributions to gray iron metallurgy and ferrous foundry practice.

As host to the national AFA organization, the Detroit Chapter has been active through its different committees in making arrangements for various details of the convention. The chapter's general convention committee is headed by Chapter Chairman Arthur H. Allen, Detroit editor of THE FOUNDRY, and includes Fred J. Walls, International Nickel Co., honorary chairman; C. E. Silver, vice chairman; William W. Bowring, Frederic B. Stevens Inc., treasurer; R. E. Cleland, Eastern Clay Products Inc., secretary, and Charlotte L. Gorney, assistant secretary.

Scores of Detroit plants in the foundry and allied industries will be open for inspection by visitors to the convention, mostly on an informal basis and preferably in small groups. Arrangements for plant visitations, both formal and informal, are under direction of Horace M. Bringhurst, Semet-Solvay Co., chairman of the plant visitation committee, of which John Linabury, General Motors Corp., is vice chairman.

Special trips will be arranged according to the

A Convention

desires of visitors on Tuesday, Wednesday and Thursday, morning or afternoon, to the Cadillac Motor Car Division of General Motors, where the completely rebuilt and modernized foundry and car assembly lines will be available for inspection. Likewise the Packard Motor Car Co. will have its foundry and final assembly lines groomed for reception of outside guests. Friday has been designated as "Ford Day" and will include specially conducted tours of Ford Motor Co.'s Rouge plant and foundry.

Visitors will be welcomed to the following plants, but it is improbable that groups will be large enough to warrant arranging special transportation:

Detroit Gray Iron Foundry Co.—General jobbing work in gray iron.

Central Iron Foundry Co.—Heavy gray iron jobbing work.

Riley Stoker Corp.—Gray iron duplexing with electric furnaces.

American Car & Foundry Co.—Molding and machining of lubricated valves.

Atlas Foundry Co.—General jobbing castings in gray iron.

Motor & Machinery Castings Co.—Gray iron jobbing foundry.

United States Radiator Corp.—Large sectional heating boilers.

Kelsey-Hayes Wheel Co.—Centrifugal casting of brake drums.

Detroit Steel Casting Co.—New installation of two electric arc furnaces.

Michigan Steel Casting Co.—Precision castings by the lost wax process.

Federal-Mogul Corp.—Bronze foundry and machine shop.

Sherwood Brass Works—Fully mechanized brass foundry.

Visitors also may make special arrangements for trips to the foundries of Buick Motor Division, Flint, Mich.; Saginaw Malleable Iron Plant, Saginaw, Mich., or Wilson Foundry & Machine Co., Pontiac, the latter a division of Willys-Overland Motors Inc.

Prepare Ladies Entertainment Program

With approximately 200 visiting ladies expected to be in Detroit for the convention, the Detroit Chapter's ladies entertainment committee, working under the direction of Mr. and Mrs. H. W. Dietert, have drawn up an ambitious program of events.

On Monday afternoon, 3 to 5 p.m., the AFA annual tea and style show are scheduled at the Women's City Club. In the evening facilities will be available to the ladies for bridge or other diversion at the Book-Cadillac and Statler Hotels.

Tuesday afternoon will be devoted to a trip by chartered bus to the Greenfield Village and Museum where visitors may inspect the remarkable collection of early Americana which the Henry Ford family has assembled over the years. Although it would take days to cover this enormous display adequately, it is hoped the visiting ladies may be able to see the highlights in a few hours, following which luncheon will be served at Dearborn Inn.

On Wednesday afternoon, the ladies will travel by chartered buses to the Detroit Yacht Club on Belle Isle for luncheon and entertainment, followed by a trip along Detroit's Lake Shore Drive. Preceding the luncheon buses will take the visitors to Canada by tunnel, with a brief stop in Windsor for a shopping tour, and a return to Detroit via the Ambassador Bridge.

The Thursday schedule will remain open for visiting ladies to permit them to journey around Detroit stores and such landmarks as the Institute of Arts, General Motors and Fisher buildings and the like. Tentative plans are also being drawn for attendance at a morning broadcast of the Coffee Club at radio station WWJ.

Detroit Convention

Rackham Educational Memorial, where morning and afternoon sessions of the convention's opening day will be held. All other sessions are scheduled for the Statler and Book-Cadillac Hotels

(Program corrected to March 14)

Monday, April 28

8:30 a.m.—Registration

10 a.m. (A)—Aluminum and Magnesium Session

Chairman, W. E. Sicha, Aluminum Co. of America, Cleveland. Co-chairman: J. C. DeHaven, Battelle Memorial Institute, Columbus, O.

Influence of Inclusions on Properties of Sand Cast Aluminum Base Alloys—A. W. Dana, L. J. Ebert, and G. Sachs, Case School of Applied Science, Cleveland.

Some Causes of Pinhole Blows in Magnesium Alloy Castings—H. H. Fairfield and A. E. Murton, Bureau of Mines, Ottawa, Ont., Canada.

10 a.m. (B)—Educational Division Business Meeting

Chairman, Fred G. Sefing, International Nickel Co., New York. Co-chairman, A. W. Gregg, Whiting Corp., Harvey, Ill.

10 a.m. (C)—Malleable Iron Session

Chairman, Carl F. Joseph, Central Foundry Div., General Motors Corp., Saginaw, Mich. Co-chairman, W. D. McMillan, International Harvester Co., McCormick Works, Chicago.

Malleable Iron Finishing—Earl M. Strick, Erie Malleable Iron Co., Erie, Pa.

Malleable Foundry Finishing and Inspection—T. E. Poulson, Belle Ciy Malleable Iron Co., Racine, Wis.

12 noon—Buffet Luncheon

2 p.m.—General meeting

Speaker (To be announced).

4 p.m. (A)—Aluminum and Magnesium Session

Chairman, R. E. Ward, Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J. Co-chairman, W. Mader, Oberdorfer Foundries, Syracuse, N. Y.

Effect of Room Temperature Intervals Between Quenching and Aging of Aluminum Sand Casting Alloys—R. A. Quadt, Federated Metals Division, American Smelting & Refining Co., Perth Amboy, N. J.

Methods of Impregnation To Leakproof Aluminum and Magnesium Alloy Castings—E. V. Blackmun, Aluminum Co. of America, Cleveland.

4 p.m. (B)—Educational Session

Chairman, Frank C. Cech, Cleveland Trade School, Cleveland. Co-chairman, B. D. Claffey, General Malleable Corp., Waukesha, Wis.

Management's View of Apprentice Training—Richard S. Falk, Falk Corp., Milwaukee.

Foundry Training Course for College Graduates—A. W. Gregg, Whiting Corp., Harvey, Ill.

Foreman Training—S. G. Garry, Caterpillar Tractor Co., Peoria, Ill.

4 p.m. (C)—Malleable Iron Session

Chairman, Russell J. Anderson, Belle City Malleable Iron Co., Racine, Wis. Co-chairman, J. A. Durr, Albion Malleable Iron Co., Albion, Mich.

Material Handling in a Malleable Foundry Processing Department—N. J. Henke, Central Foundry Div., General Motors Corp., Saginaw, Mich.

Mechanized Malleable Foundry Finishing and Inspection—D. F. Sawtelle, Malleable Iron Fittings Co., Branford, Conn.

4 p.m. (D)—Gray Iron Shop Course (1)

Chairman, E. J. Burke, Hanna Furnace Corp., Buffalo, N. Y. Co-chairman, J. E. Coon, Packard Motor Car Co., Detroit.

Variables Affecting Carbon Control in Cupola Operation. Discussion Leader: W. W. Levi, Lynchburg Foundry Co., Radford, Va.

Program

7 p.m.—Educational Session and Dinner

Chairman, A. W. Gregg, Whiting Corp., Harvey, Ill. Co-chairman, Fred G. Sefing, International Nickel Co., New York.

Speaker: Ralph L. Lee, General Motors Corp., Detroit. Subject: *Management's Stake in Personnel Training.*

8 p.m. (A)—Sand Shop Course (1) (Malleable)

Chairman, D. F. Sawtelle, Malleable Iron Fittings Co., Branford, Conn. Co-chairman, E. C. Zirzow, National Malleable & Steel Castings Co., Cleveland.

Subject: *Malleable Sand Problems.* Discussion leader: David Tamor, American Chain & Cable Co. Inc., York, Pa.

8 p.m. (B)—Aluminum and Magnesium Div. Business Meeting

Chairman, R. E. Ward, Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J.

Tuesday, April 29

10 a.m. (A)—Aluminum and Magnesium Session

Chairman, R. T. Wood, American Magnesium Corp., Buffalo. Co-chairman, Hiram Brown, Solar Aircraft Co., Des Moines, Iowa.

Simplification of Light Metal Casting Design and Its Effect Upon Serviceability—W. T. Bean Jr., Dow Chemical Co., Midland, Mich.

A New Gating Technique for Magnesium Alloy Castings—H. E. Elliot and J. G. Mezoff, Dow Chemical Co., Bay City, Mich.

10 a.m. (B)—Brass and Bronze Session

Chairman, Harry M. St. John, Crane Co., Chicago. Co-chairman, A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee.

Radiography of Gun Metal Castings—William H. Baer, Naval Research Laboratory, Washington.

Segregation in Manganese Bronze—G. E. Dalbey, Mare Island Naval Shipyard, Vallejo, Calif.

Spectrographic Analysis in the Manufacture of Brass and Bronze Ingots—G. E. Staahl, H. Kramer & Co., Chicago.

10 a.m. (C)—Malleable Iron Session

Chairman, V. A. Crosby, Climax Molybdenum Co., Detroit. Co-chairman, Milton Tilley, National Malleable & Steel Castings Co., Cleveland.

An Interpretation of the Constitution of Iron-Carbon-Silicon Alloys—J. E. Rehder, Bureau of Mines, Ottawa, Canada (formerly, Grinnell Co. of Canada Ltd., Toronto, Canada).

Effect of Section Size and Annealing Temperature on the Graphitization of White Cast Iron—R. Schneidewind and A. Tang, University of Michigan, Ann Arbor, Mich. and Don J. Reese, International Nickel Co., New York.

10 a.m. (D)—Heat Transfer Session

Chairman, Harry A. Schwartz, National Malleable & Steel Castings Co., Cleveland. Co-chairman, Howard F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.

Committee Reports on Research Projects.

An Approach to the Solution of the Feeding Problems in Cast Metals—A. F. Faber and D. T. Doll, Case School of Applied Science, Cleveland.

Calculating the Size of Gates and Risers—Nathan Janco, Centrifugal Casting Co., Tulsa, Okla.

12 noon (A)—Aluminum and Magnesium Roundtable Luncheon

Chairman, D. L. Colwell, National Smelting & Refining Co., Chicago. Co-chairman, C. E. Nelson, Dow Chemical Co., Midland, Mich.

Discussion Leader: W. E. Martin, Beryllium Corp., Reading, Pa. Subject: *Recommended Casting Practices for Aluminum and Magnesium.*

12 noon (B)—Malleable Roundtable Luncheon

Chairman, A. M. Fulton, Northern Malleable Iron Co., St. Paul. Co-chairman, James H. Lansing, Malleable Founders' Society, Cleveland.

Discussion Leaders: C. F. Lauenstein, Link-Belt Co., Indianapolis, K. H. Hamblin, the Grinnell Co., Providence, R. I. Subject: *Chromium Determinations; Grinding of Malleable Gates; Exothermic Ladle Additions.*

2 p.m. (A)—Pattern Division Business Meeting

Chairman, Vincent J. Sedlon, Master Pattern Co., Cleveland. Co-chairman, A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee.

2 p.m. (B)—Brass and Bronze Session

Chairman, George P. Halliwell, H. Kramer & Co., Chicago. Co-chairman, B. M. Loring, Naval Research Laboratory.

Correlation of Structure and Properties of 85-5-5-5 Alloy Test Bars—J. G. Kura, and L. W. Eastwood, Battelle Memorial Institute, Columbus, O.

Gas Absorption Phenomena and Deoasification of Cast Monel—B. N. Ames and N. A. Kahn, New York Naval Shipyard.

2 p.m. (C)—Malleable Division Business Meeting

Chairman, A. M. Fulton, Northern Malleable Iron Co., St. Paul. Co-chairman, W. B. McFerrin, Electro Metallurgical Co., Detroit.

2 p.m. (D)—Steel Session

Chairman, Charles W. Briggs, Steel Founders' Society of America, Cleveland. Co-chairman, L. H. Hahn, Sivyer Steel Castings Co., Chicago.

Institute of British Foundrymen Exchange Paper—*Side-Blow Converter Practice*, by F. Cousans, Catton & Co. Ltd., Leeds, England.

Effect of Melting Practice on Properties of Medium-Carbon Low Alloy Cast Steels—John G. Kura and N. H. Keyser, Battelle Memorial Institute, Columbus.

The Influence of Selenium on the Sulphide Form and Ductility of Cast Steel—A. P. Gagnebin, Internationl Nickel Co. Bayonne, N. J.

2 p.m. (E)—Sand Session

Chairman, E. C. Zirzow, National Malleable & Steel Castings Co., Cleveland. Co-chairman, C. R. Wolf, New Jersey Silica Sand Co., Millville, N. J.

Elevated Temperature Properties of Steel Foundry Sands—D. C. Williams, Cornell University, Ithaca, N. Y.

Preparation of Foundry Sands for Market—F. P. Goettman, G. F. Pettinos, Inc., Philadelphia.

Evaluation of Core Knockout—Harry W. Dietert, H. W. Dietert Co., Detroit.

2 p.m. (F)—Gray Iron Session

Chairman, R. G. McElwee, Vanadium Corp. of America, Detroit. Co-chairman, W. W. Levi, Lynchburg Foundry Co., Radford, Va.

Cupola Melting Phenomena—D. W. Gunther and E. V. Somers, Westinghouse Electric Corp., Trafford, Pa.

Welding Cast Iron with Nickel Electrodes—T. E. Kihlgren, International Nickel Co., Bayonne, N. J.

4 p.m. (A)—Refractories Session

Chairman, Richard H. Stone, Vesuvius Crucible Co., Pittsburgh. Co-chairman, Arthur S. Klopf, Western Foundry Co., Chicago.

Special Refractories in Metal Melting—W. H. Henson, Norton Co., Worcester, Mass.

Information Please—Question and Answer Panel

4 p.m. (B)—Sand Division Business Meeting

Chairman, H. Ries, Ithaca, N. Y. Co-chairman, Peter E. Kyle, Cornell University, Ithaca, N. Y.

4 p.m. (C)—Patternmaking Session

Chairman, Vincent J. Sedlon, Master Pattern Co., Cleveland. Co-chairman, A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee.

A Purchasing Agent's Considerations in Purchasing Patterns—W. G. Schuller, Caterpillar Tractor Co., Peoria, Ill.

Liquid Phenolic Casting Resins for Foundry Patterns—C. R. Simmons, Durez Plastics & Chemicals Inc., North Tonawanda, N. Y.

7 p.m.—Chapter Officers and Directors Dinner

Chairman, Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.

8 p.m. (A)—Sand Shop Course (2) (Nonferrous)

Chairman, Earl J. Bush, Navy Yard, Washington. Co-chairman, E. W. Horlebein, Gibson & Kirk Co., Baltimore.

Discussion Leader: W. M. Ball Jr., Magnus Brass Division, National Lead Co., Cincinnati. Subject: *Your Sand Pile.*

8 p.m. (B)—Gray Iron Shop Course (2)

Chairman, W. W. Levi, Lynchburg Foundry Co., Radford, Va. Co-chairman, C. J. Rittinger, American Car & Foundry Co., Detroit.

Discussion Leader: D. E. Krause, Battelle Memorial Institute, Columbus, O. Subject: *Effect of Coke Quality on Cupola Melting.*

8 p.m. (C)—Inspection of Castings Session

Chairman, H. R. Youngkrantz, Apex Smelting Co., Chicago. Co-chairman, H. C. Stone, Belle City Malleable Iron Co., Racine, Wis.

Importance of Radiography to Inspection—E. L. LaGrelius, American Steel Foundries, East Chicago, Ind.

Magnetic Particle Inspection in the Foundry—W. E. Thomas, Magnaflux Corp., Chicago.

Wednesday, April 30

10 a.m. (A)—Gray Iron Session

Chairman, B. P. Mulcahy, Indianapolis. Co-chairman, H. W. Stuart, U. S. Pipe & Foundry Co., Burlington, N. J.

Critical Survey of Foundry Coke—D. E. Krause and H. W. Lownie, Jr., Battelle Memorial Institute, Columbus, O.

Thermochemical Analysis of Combustion in a Cupola—H. E. Flanders, University of Utah, Salt Lake City, Utah.

10 a.m. (B)—Steel Session

Chairman, C. H. Lorig, Battelle Memorial Institute, Columbus, O. Co-chairman, E. C. Troy, Dodge Steel Co., Philadelphia.

Slag Control in the Acid Electric Furnace—H. H. Johnson, M. T. McDonough and D. L. Radford, National Malleable & Steel Castings Co., Sharon, Pa.

Application of a Single Slag Process to Basic Electric Steel—M. V. Healey and R. W. Thomas, General Electric Co., Schenectady, N. Y.

10 a.m. (C)—Sand Session

Chairman, G. R. Gardner, Aluminum Co. of America, Cleveland. Co-chairman, K. J. Jacobson, Griffin Wheel Co., Chicago.

New Tentative Standards for Grading and Fineness of Sands—R. E. Morey, Naval Research Laboratory, Washington.

The Foundry Sand Laboratory—O. J. Myers, Werner G. Smith Co., Minneapolis.

A Study of the Precision of Sand Test Data—R. E. Morey and C. J. Ackerlind, Naval Research Laboratory, Washington.

10 a.m. (D)—Brass and Bronze Division Business Meeting

Chairman, D. Frank O'Connor, American Saw Mill Machinery Co., Hackettstown, N. J. Co-chairman, W. W. Edens, Ampco Metal Inc., Milwaukee.

12 noon (A)—Canadian Luncheon

12 noon (B)—Brass and Bronze Roundtable Luncheon

Chairman, B. A. Miller, Baldwin Locomotive Works, Philadelphia. Co-chairman, Roger J. Keeley, Ajax Metal Co., Philadelphia.

Melting of Brass and Bronze—Herman Smith, Federated Metals Division, American Smelting & Refining Co., Pittsburgh.

12 noon (C)—Engineering School Graduates Luncheon

Chairman, Fred J. Walls, International Nickel Co., Detroit. Co-chairman, George K. Dreher, San Marino, Calif.

2 p.m.—Annual Meeting and Charles Edgar Hoyt Annual Lecture

Chairman, S. V. Wood, president, AFA.

"Charles Edgar Hoyt Annual Lecture"—*The Cupola Furnace*, by James T. MacKenzie, American Cast Iron Pipe Co., Birmingham.

Apprentice Contest Awards.

Election of Officers and Directors.

7 p.m.—AFA Alumni Dinner

Chairman, Fred J. Walls, International Nickel Co., Detroit. Speaker, John H. Van Deventer, director of information, Committee for Economic Development, New York.

8 p.m. (A)—Steel Division Business Meeting

Chairman, C. H. Lorig, Battelle Memorial Institute, Columbus, O. Co-chairman, H. H. Blošjo, Minneapolis Electric Steel Castings Co., Minneapolis.

8 p.m. (B)—Sand Shop Course (3) (Steel)

Chairman, R. H. Jacoby, Key Co., St. Louis. Co-chairman, Stanley W. Brinson, Norfolk Naval Shipyard, Portsmouth, Va.

Discussion Leader: J. B. Caine, Sawbrook Steel Castings Co., Cincinnati. Subject: *The Role of Sand in Hot Tearing.*

8 p.m. (C)—Gray Iron Shop Course (3)

Chairman, J. H. Bernard, Eaton Mfg. Co., Vassar, Mich. Co-chairman, K. E. Davis, Cadillac Motor Car Co., Detroit.

Discussion Leader: Lyle L. Clark, Buick Motor Car Co., Flint, Mich. Subject: *Factors Affecting Cost of Cupola Operation.*

8 p.m. (D)—Plant and Plant Equipment Session

Chairman, James Thomson, Continental Foundry & Machine Co., East Chicago, Ind. Co-chairman, E. W. Beach, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

Design and Operating Phases of Mechanized Foundries—C. O. Bartlett, C. O. Bartlett & Snow Co., Cleveland.

Thursday, May 1

8:30 a.m.—Cost Committee Breakfast

Chairman, Ralph L. Lee, Grede Foundries Inc., Milwaukee.

10 a.m. (A)—Gray Iron Session

Chairman, V. A. Crosby, Climax Molybdenum Co., Detroit. Co-chairman, Harold Meyers, Sealed Power Corp., Muskegon, Mich.

The Graphite Phase in Gray Cast Iron—R. W. Lindsay, Pennsylvania State College, State College, Pa.

Metallographic Structure of Silvery Pig Iron—R. Schneidewind, University of Michigan, Ann Arbor, Mich., and C. A. Harmon, Hanna Furnace Corp., Buffalo.

Micro-Radiography of Gray Cast Iron—J. H. Schaum, E. T. Salkovitz, and F. W. Von Batchelder, Naval Research Laboratory, Washington.

10 a.m. (B)—Steel Session

Chairman, J. A. Rassenfoss, American Steel Foundries, Indiana Harbor, Ind. Co-chairman, G. Vennerholm, Ford Motor Co., Dearborn, Mich.

Occurrence of Intergranular Fracture in Cast Steels—C. H. Lorig and A. R. Elsea, Battelle Memorial Institute, Columbus, O.

Segregation in Small Steel Castings—H. F. Bishop and K. E. Fritz, Naval Research Laboratory, Washington.

10 a.m. (C)—Job Evaluation and Time Study Session (1)

Chairman, R. J. Fisher, Falk Corp., Milwaukee. Co-chairman, Jeff Alan Westover, Westover Engineers, Milwaukee.

Establishment and Use of Standard Data—Milton Annich, American Brake Shoe Co., Mahwah, N. J.

(Photo courtesy Dodge Bros. Division, Chrysler Corp.)

12 noon (A)—Steel Roundtable Luncheon

Chairman, F. A. Melmoth, Glen Lake, Cedar, Mich. Co-chairman, John Howe Hall, Swarthmore, Pa.

12 noon (B)—Pattern Roundtable Luncheon

Chairman, H. K. Swanson, Swanson Pattern & Model Works, East Chicago, Ind. Co-chairman, G. A. Pealer, Elmira Foundry Co., Elmira, N. Y.

Discussion Leader: A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee. Subject: *Need for Close Relationship Among Patternmakers and Foundrymen.*

2 p.m. (A)—Foundry Cost Session

Chairman, Ralph L. Lee, Grede Foundries Inc., Milwaukee. Co-chairman, George E. Tisdale, Zenith Foundry Co., Milwaukee.

Two Ways to Make Profit—W. E. George, Booz, Allen & Hamilton, Chicago.

Foundry Costs and Cost Controls—C. E. Westover, Westover Engineers, Milwaukee.

2 p.m. (B)—Gray Iron Session

Chairman, H. Bornstein, Deere & Co., Moline, Ill. Co-chairman, J. E. Bowen, Chevrolet Gray Iron Foundry, Saginaw, Mich.

Effects on Gray Iron of Minor Constituents Derived from the Additions of Copper Alloys—K. E. Rose and C. H. Lorig, Battelle Memorial Institute, Columbus, O.

Isothermal Transformation of Molybdenum Cast Iron—C. A. Nagler, Wayne University, Detroit and R. L. Dowdell, University of Minnesota, Minneapolis.

Reduction in Chilling Tendency Through Silicon Carbide Inoculation of Gray Cast Iron—E. A. Loria, H. D. Shepard and A. P. Thompson, Mellon Institute, Pittsburgh.

2 p.m. (C)—Gray Iron Shop Course

Chairman, Howard H. Wilder, Eaton Mfg. Co., Vassar, Mich. Co-chairman, George A. Timmons, Climax Molybdenum Co., Detroit.

Discussion Leader: Kenneth H. Priestley, Vassar Electroloy Products Inc., Vassar, Mich. Subject: *Variables Affecting Electric Furnace Gray Iron.*

2 p.m. (D)—Sand Session

Chairman, E. C. Troy, Dodge Steel Co., Philadelphia. Co-chairman, B. H. Booth, Carpenter Bros. Inc., Milwaukee.

Density of Molding Sands—Harry W. Dietert, H. H. Fairfield, and E. J. Hasty, H. W. Dietert Co., Detroit.

Physical Properties of Molding Sands—G. R. Gardner, Aluminum Co. of America, Cleveland.

4 p.m. (A)—Steel Session

Chairman, J. B. Caine, Sawbrook Steel Castings Co., Cincinnati, O. Co-chairman, C. K. Donoho, American Cast Iron Pipe Co., Birmingham.

Determination of Molten Metal Temperatures—G. Vennerholm and L. C. Tate, Ford Motor Co., Dearborn, Mich.

Temperature Distribution in Metal Molds—M. C. Udy and H. O. McIntire, Battelle Memorial Institute, Columbus, O.

4 p.m. (B)—Sand Shop Course (4) (Gray Iron)

Chairman, E. L. Thomas, Cadillac Motor Car Co., Detroit. Co-chairman, F. R. Mason, Riley Stoker Co., Detroit.

Discussion Leader: C. B. Schofield, Chevrolet Gray Iron Foundry, Saginaw, Mich. Subject: *Variables in Gray Iron Sand Practice.*

4 p.m. (C)—Gray Iron Division Business Meeting

Chairman, T. E. Eagan, Cooper-Bessemer Corp., Grove City, Pa. Co-chairman, R. J. Allen, Worthington Pump & Machinery Corp., Harrison, N. J.

4 p.m. (D)—Job Evaluation and Time Study Session (2)

Chairman, R. J. Fisher, Falk Corp., Milwaukee. Co-chairman, Jeff Alan Westover, Westover Engineers, Milwaukee.

Establishment and Use of Standard Data—Milton Annich, American Brake Shoe Co., Mahwah, N. J.

7 p.m.—Annual Banquet

Detroit Chapter Committee Members

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Promotion Committee

AFA Awards

To Honor Six

HENRY S. WASHBURN

Outstanding Foundrymen

BOARD of Awards of the American Foundrymen's Association has selected six outstanding foundrymen to be honored this year for their outstanding service to the foundry industry. Awarding of four gold medals and two honorary life memberships to these men will be a feature of the AFA annual banquet to be held May 1 at the conclusion of the Detroit convention.

HENRY S. WASHBURN, president, Plainville Casting Co., Plainville, Conn., will receive the Joseph S. Seaman Gold Medal of the AFA "for outstanding service to the association and valuable contributions to the gray iron casting industry."

RUSSELL J. ALLEN, metallurgical engineer, Worthington Pump & Machinery Corp., Harrison, N. J., will be awarded the John A. Penton Gold Medal of the association "for his earnest and unceasing contributions toward the advancement of gray iron technology."

SHELDON V. WOOD

JOHN GRENNAN

HARRY M. ST. JOHN, superintendent, brass foundry and forge shop, Crane Co., Chicago, will be the recipient of the William H. McFadden Gold Medal of the AFA "for outstanding work in the field of nonferrous casting research over a period of many years."

RICHARD A. FLINN JR., metallurgist, American Brake Shoe Co., Mahwah, N. J., will receive the Peter L. Simpson Gold Medal of the association "for outstanding work during the last year in the field of chilled and white iron castings."

JOHN GRENNAN, foundry practice instructor (retired), University of Michigan, Ann Arbor, Mich., has been elected an honorary

HARRY M. ST. JOHN

RICHARD A. FLINN JR.

RUSSELL J. ALLEN

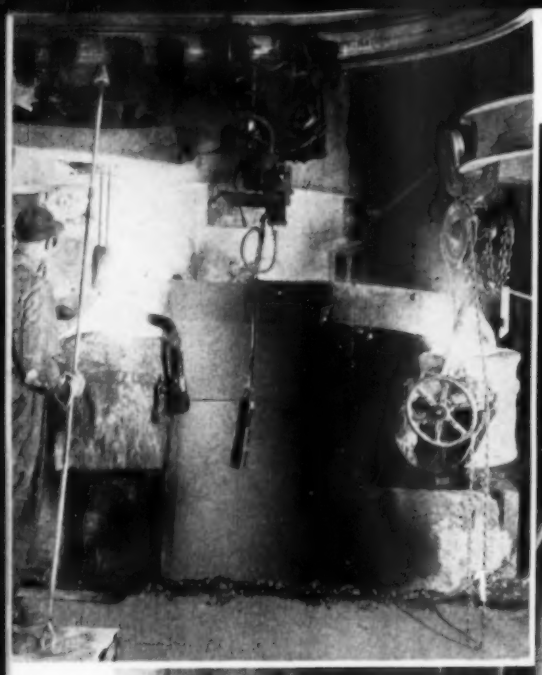
life member of the AFA "for long service to the association, collaboration in technical papers of value to the industry, and for his constant encouragement of young men toward the castings industry."

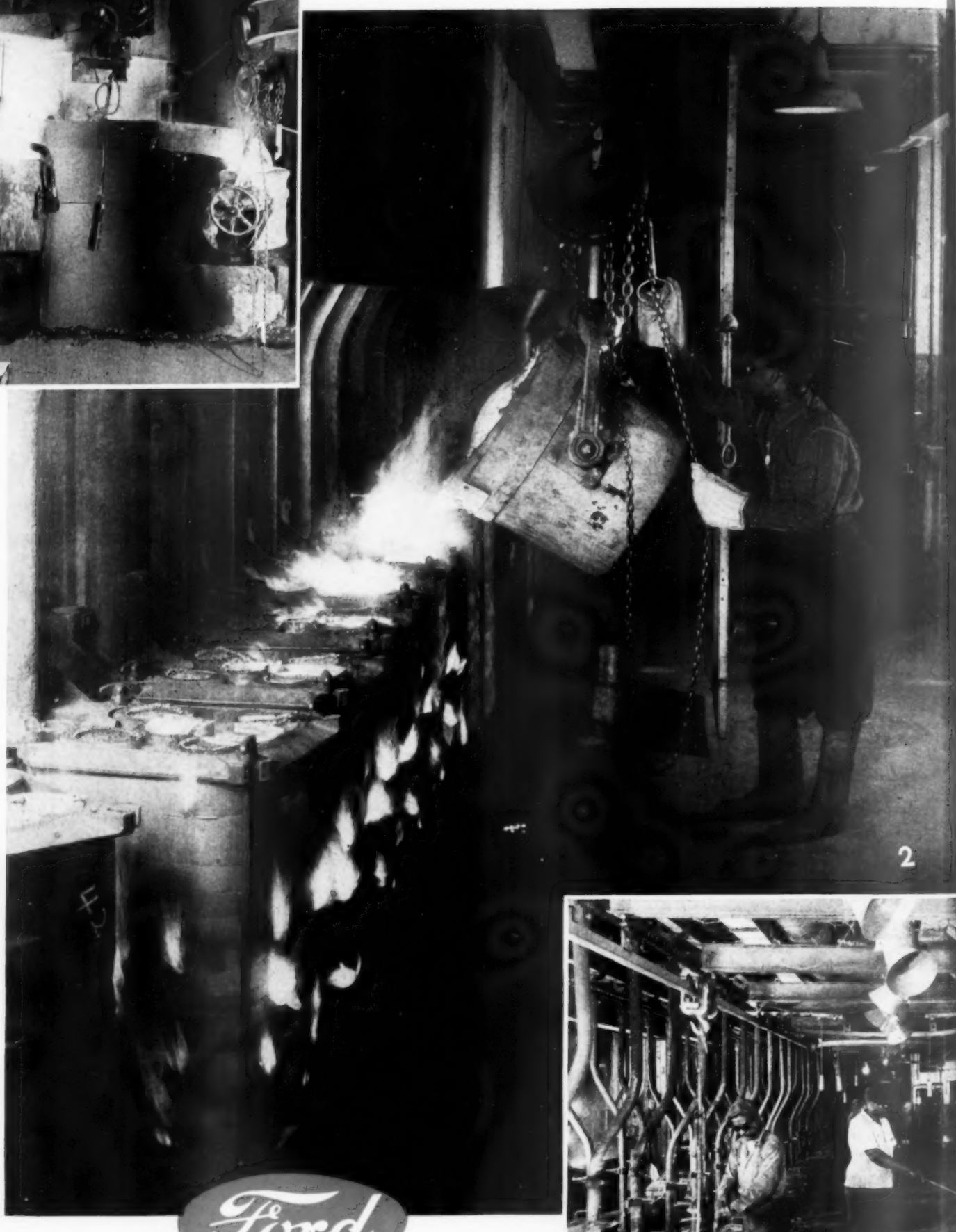
SHELDON V. WOOD, president, Minneapolis Electric Steel Castings Co., Minneapolis, has been named to honorary life membership in the association "as retiring president of the AFA."

Henry S. Washburn was born in Brooklyn, N. Y., received his early education at St. Paul's School, Garden City, N. Y., and later attended Yale University. His first commercial position was as bookkeeper with the Corn Exchange Bank of New York. From 1906 to 1917 he held various positions as clerk, credit man and office manager with Delaware, Lackawanna & Western Railroad, H. B. Clafin Co., and Butler Bros., of New York. He spent the following four years as purchasing agent, Turner & Seymour, Torrington, Conn., and since 1921 has been president and treasurer of the Plainville Casting Co. Mr. Washburn has served as director and vice president of the AFA and was elected national president in 1939. He is a member of National Founders' Association and a past director of the Gray Iron Founders' Society. The latter society's award for distinguished service to the industry was presented Mr. Washburn in 1946.

Russell J. Allen, born in Port Huron, Mich., was graduated from University of Toronto in 1913, with a degree of bachelor of applied science. Following several miscellaneous connections, he became metallurgist at the Springfield, Mass., plant of Rolls-Royce of America Inc., in 1919, and remained there until that company discontinued its operations in this country, in 1930. He became associated with Worthington Pump & Machinery Corp. at that time, as chief metallurgist, with direct supervision over metallurgical activities in all plants operated by the company, and later was made consulting metallurgist. Mr. Allen was active in the organization of the Metropolitan Chapter of the AFA and served as director, vice chairman, and as chairman in 1940. He was a director of the national organization the following year. Other technical society memberships include American Society for Metals, American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials, American Petroleum Institute and the British Iron and Steel Institute.

Harry M. St. John, a native of Canajoharie, N. Y., was graduated from Cornell University in 1910. For three years he was research chemist, (*Please turn to page* 180)





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Ford

DETROIT, more than any other city, typifies the center of industrial mass production, this applying not only to manufactured articles but also to component parts—including castings. Nowhere else is there such a concentration of mechanized high production foundries as is to be found in the Detroit area. Views of various operations in several of the large automotive foundries are shown here and on the next ten pages.

For the visitor attending the annual AFA convention in Detroit late this month, availability for inspection of these major foundries as well as a diversified group of smaller ferrous and nonferrous foundries offers a special opportunity. Details of the plant visitation arrangements prepared by a special committee of the Detroit Chapter of the AFA are presented on page 83.

Highlighting the visitation program is "Ford Day," planned for Friday, May 2, the day after the convention officially closes. This will include conducted tours through the huge Ford Rouge plant and foundry. The latter, termed the world's largest, has a daily melting capacity of 2000 tons of gray iron and steel for the production of 6000 engine blocks and other castings.

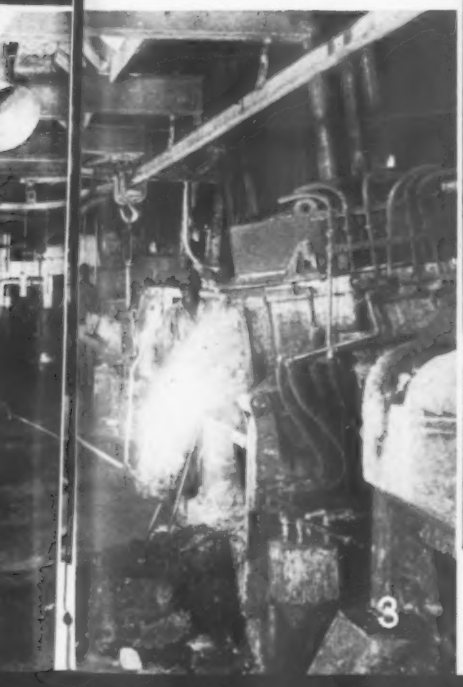
Automotive Foundries *Around Detroit*

Fig. 1—Double tapping one of the Ford Motor Co.'s 90-in. cupolas in the production foundry at Dearborn, Mich. This foundry is equipped with ten 78-in. cupolas producing 10 tons each an hour; four 90-in. cupolas yielding 15 tons each an hour, and four 120-in. cupolas producing 25 tons each an hour.

Fig. 2—Pouring cast steel crankshafts into dry sand molds at the Ford foundry. The crankshaft mold is composed of 16 sand sections built up on a continuous conveyor and carried direct to the casting station.

Fig. 3—Tapping electric furnaces (right) and pouring hot metal into molds (carried by conveyor, left) in casting valves and inserts, intake valves and exhaust valves.

Fig. 4—Final shakeout station of Ford V-8 cylinder blocks after shot-blast cleaning. The foundry has arranged and equipped a new motor block cleaning system.



Ford
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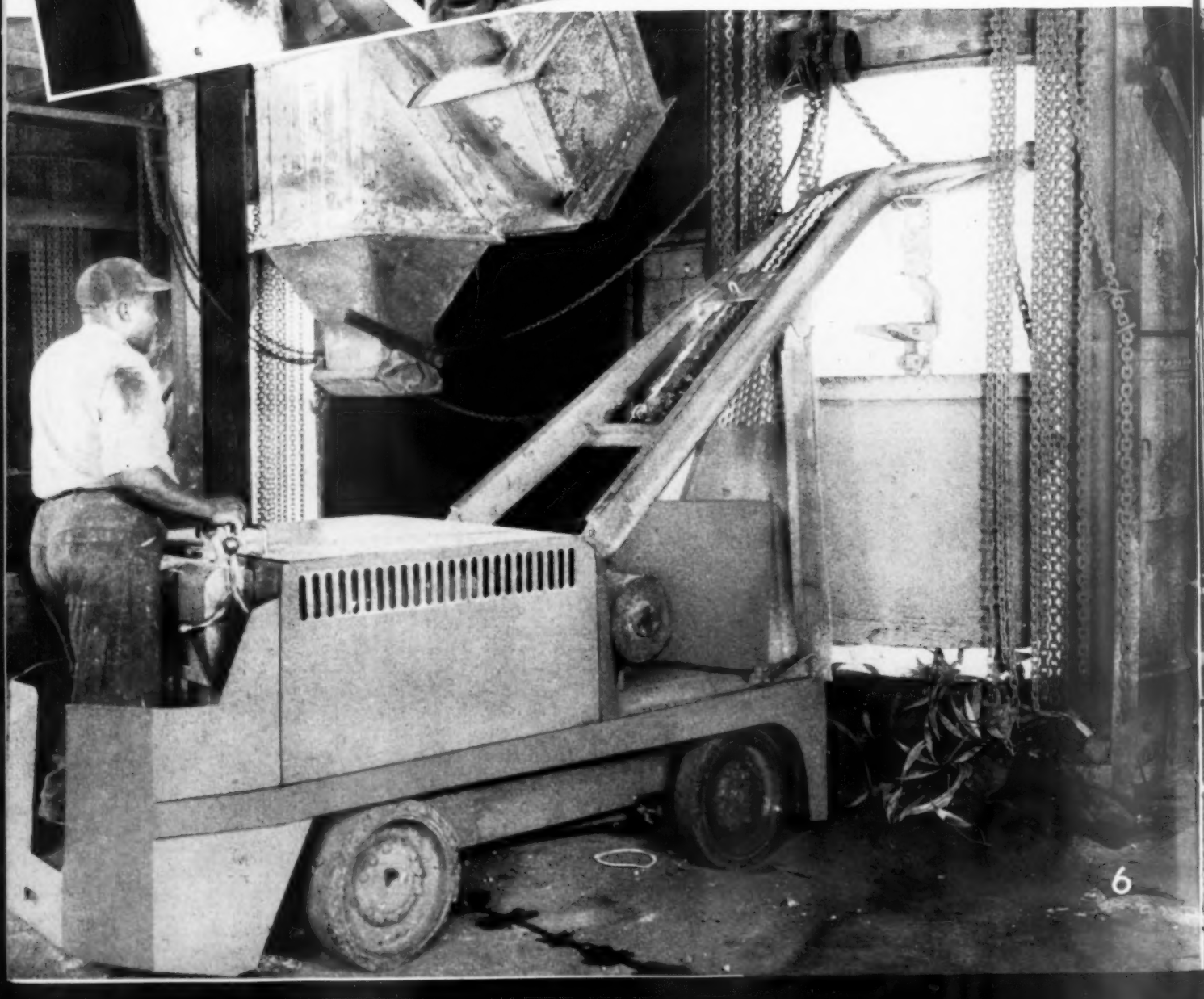
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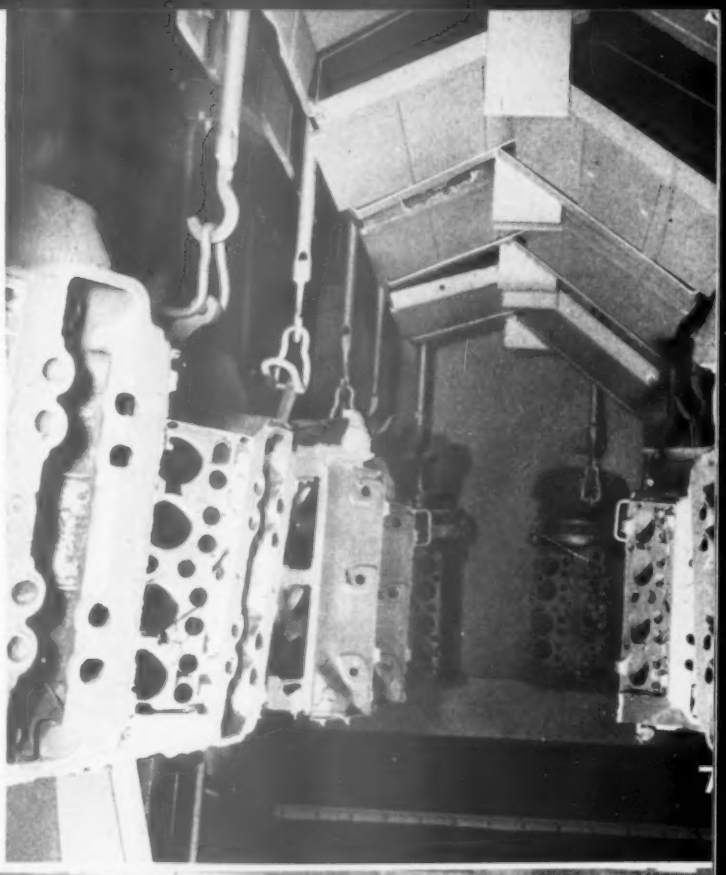
Fig. 5—Ford V-8 cylinder block, cast in a single piece, requires 46 cores. Placing of water jacket core in V-8 cylinder block mold is shown here. Molding department of the production foundry is highly mechanized, capable of producing molds for casting 5500 to 6000 cylinder blocks in 16 hours. Both molds and cores are built up on a conveyor that carries them direct to the metal pouring system.

Fig. 6—Trucks automatically dump charging materials within the 78-in. cupolas. Charging equipment includes cranes, dump scales, round steel charging buckets (shown entering cupola on right) and special battery-driven charging trucks.

Fig. 7—Interior view of shot-blast cabinet and conveyor for cleaning V-8 cylinder blocks.

Fig. 8—Charging platform of the production foundry now is completely mechanized. This view shows mechanical handling equipment used in making up the charge of material for cylinder block metal.



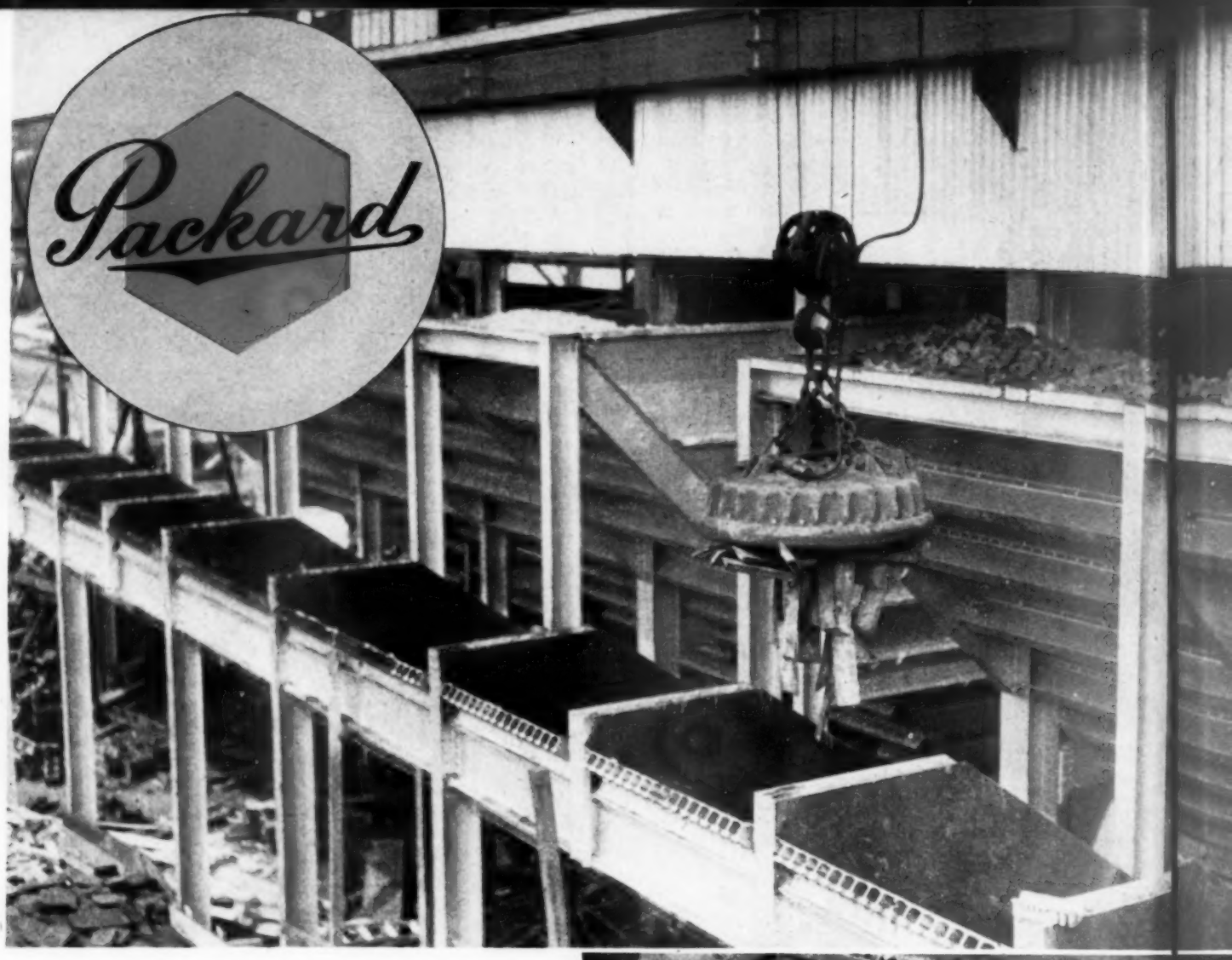
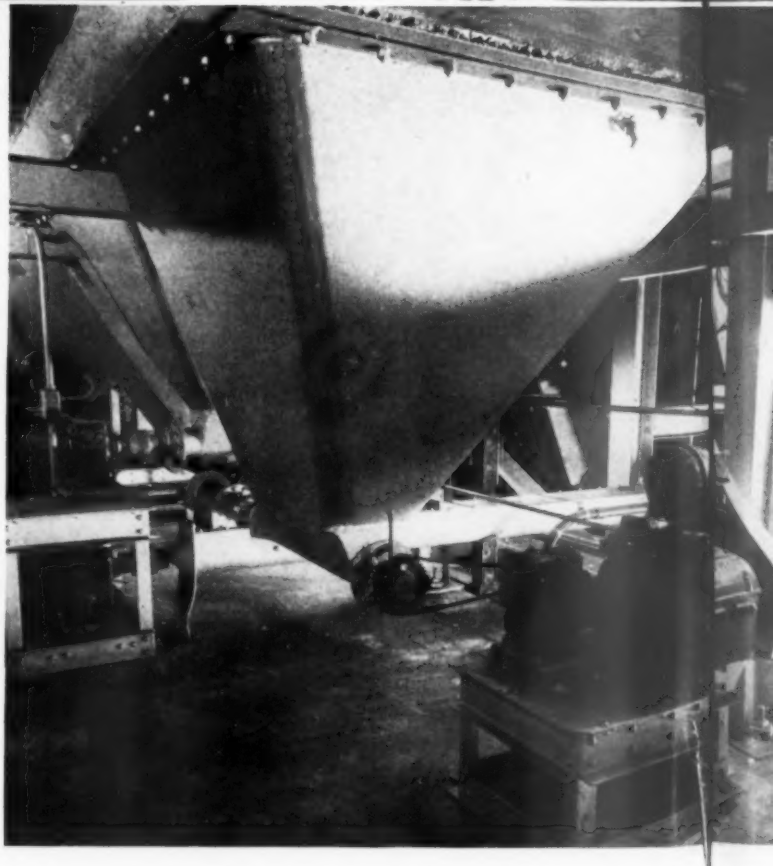


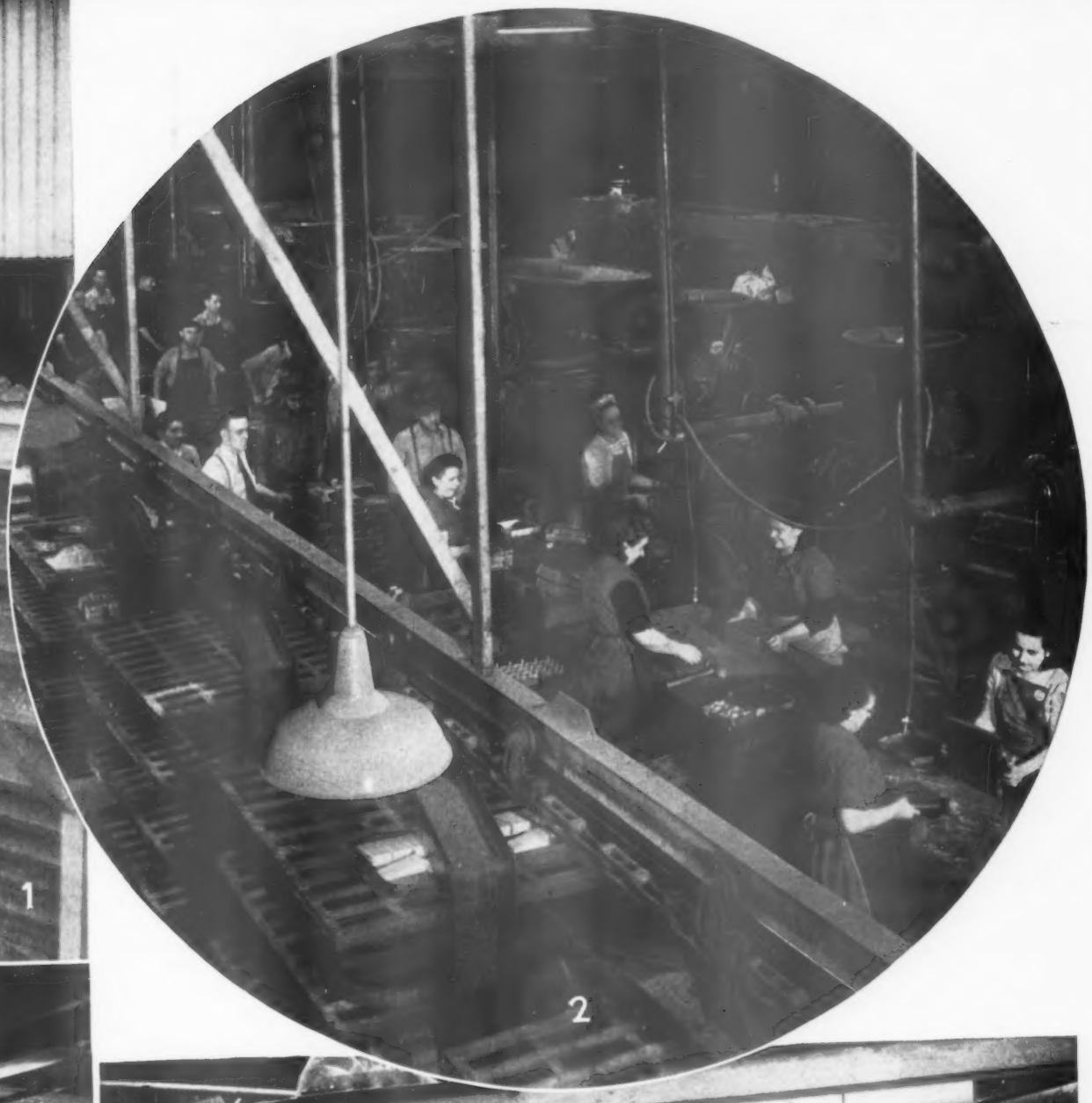
Fig. 1—Electrically-operated charging cars equipped with automatic scales gather material in 3000-lb capacity buckets from storage bins shown here, and carry them directly into cupolas in the Packard Motor Car Co. foundry, Detroit

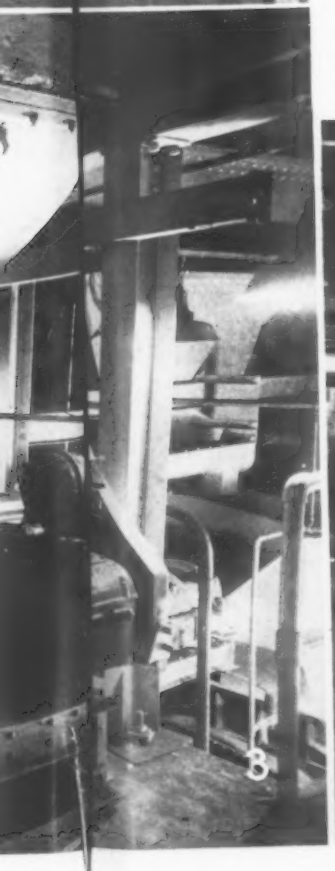
Fig. 2—A view of miscellaneous core blowing machines in the Packard gray iron foundry for production of cylinder blocks

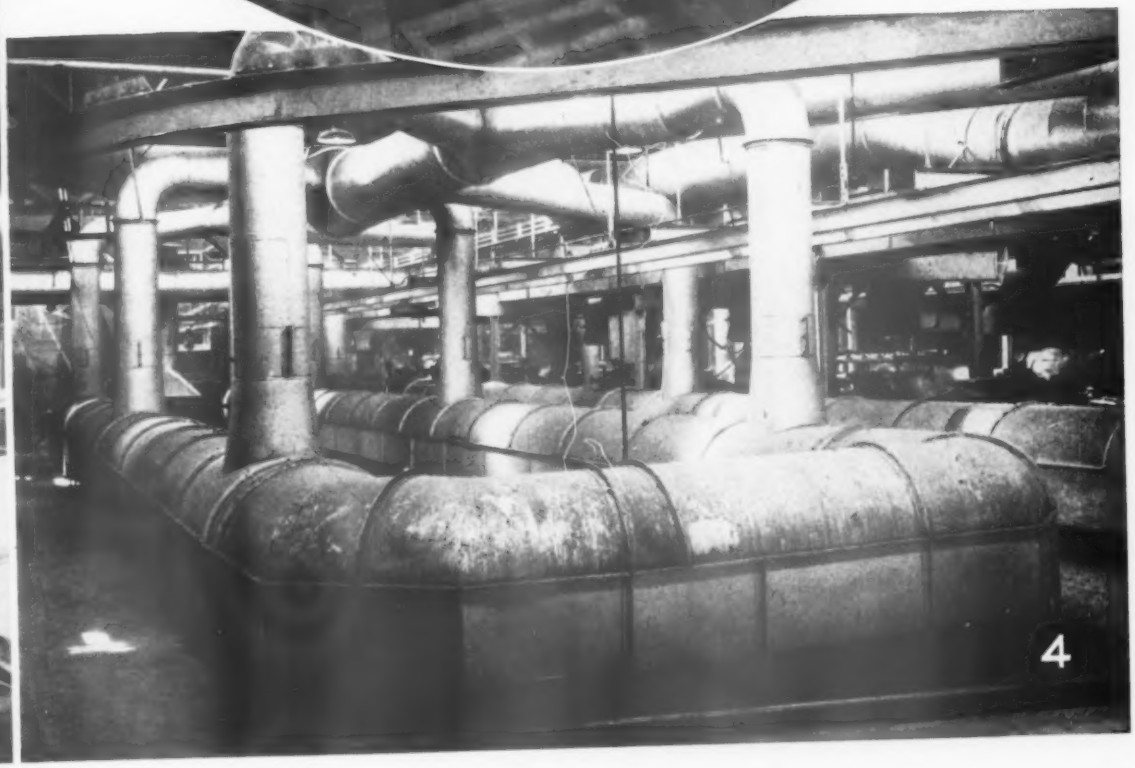
Fig. 3—Accurately measuring bonding clay and seacoal by means of screw-type conveyors and electrically-controlled variable speed drive

Fig. 4—Ventilating system in the Packard foundry which takes off gas and smoke from the molds after hot metal has been poured









DODGE

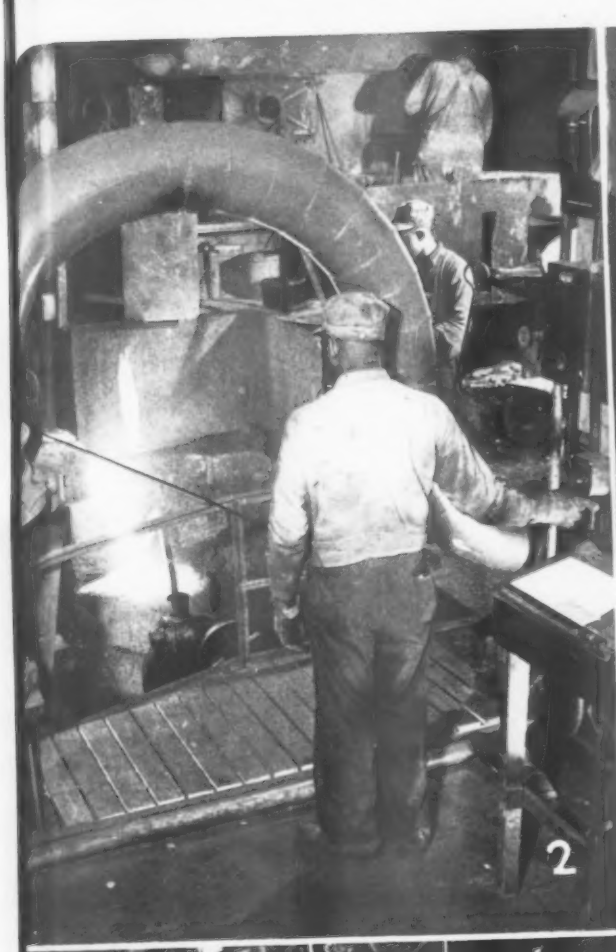
Fig. 1—Drag with cores for two cylinder blocks is shown in foreground, while cope is ready to be lowered onto adjoining drag. This scene is at the Dodge Foundry, Dodge Main Plant, Chrysler Corp., Detroit.

Fig. 2—Pouring iron for crankcases from tilting holding furnace in the Dodge Foundry.

Fig. 3—Pouring cylinder blocks in molds similar to those shown in Fig. 1.

Fig. 4 — Sandslinger turntable where molds for cylinder blocks are assembled. Note two blocks per mold.

Fig. 5—Pouring molds for flywheel and clutch castings.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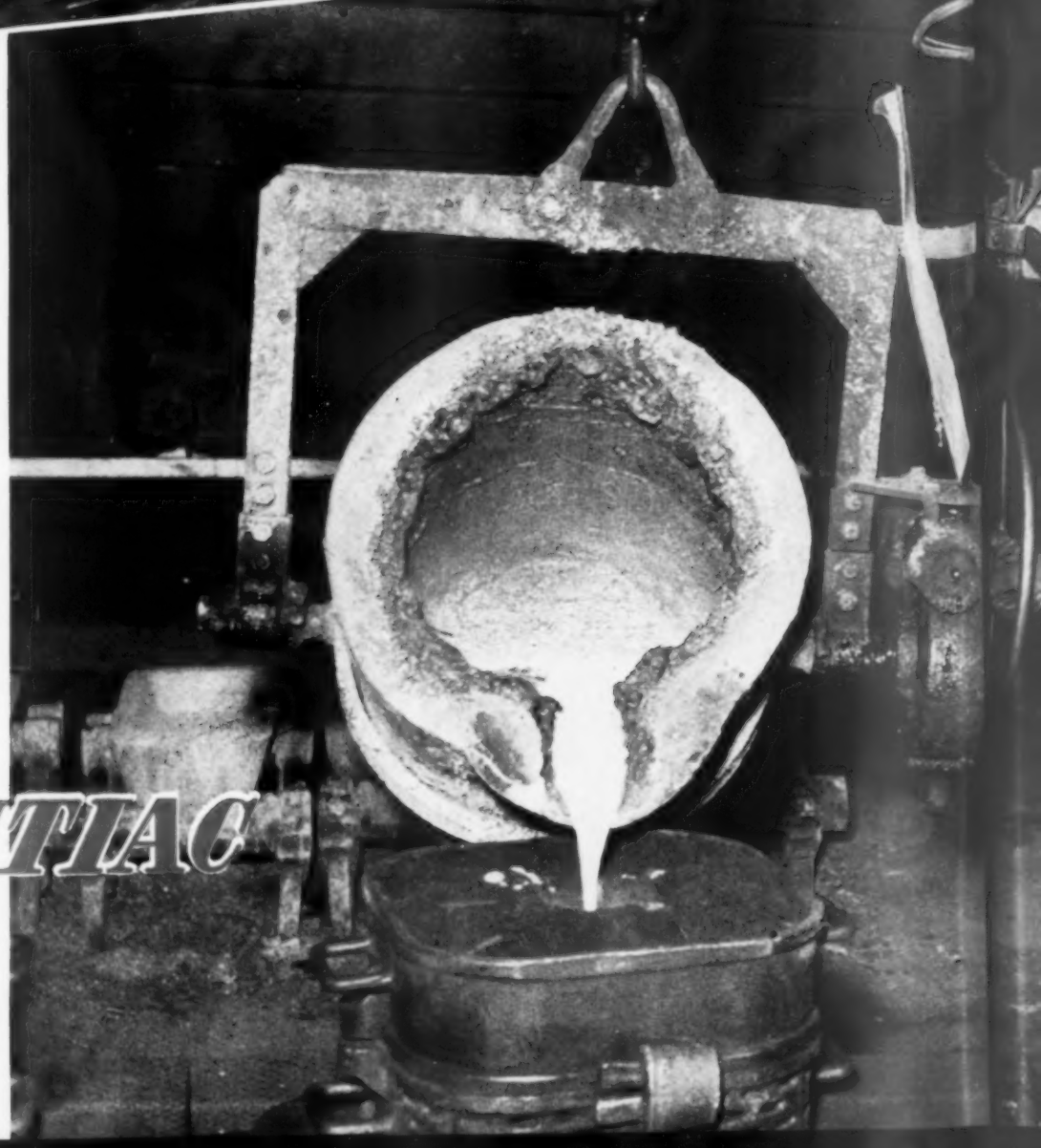


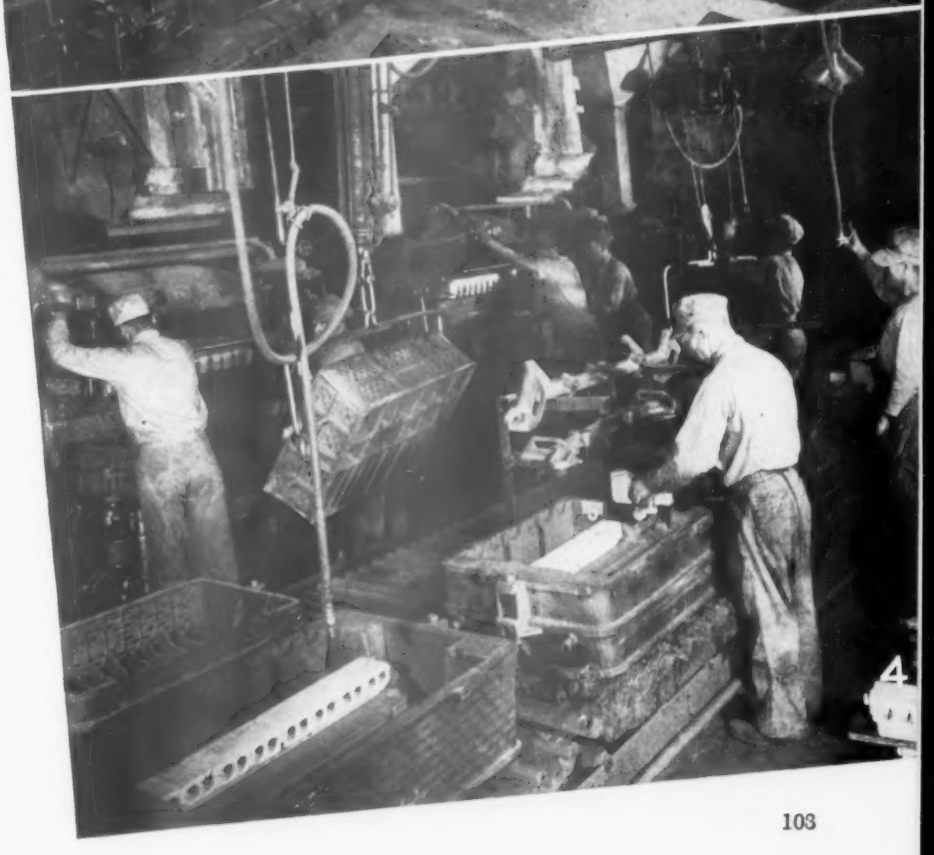
PONTIAC

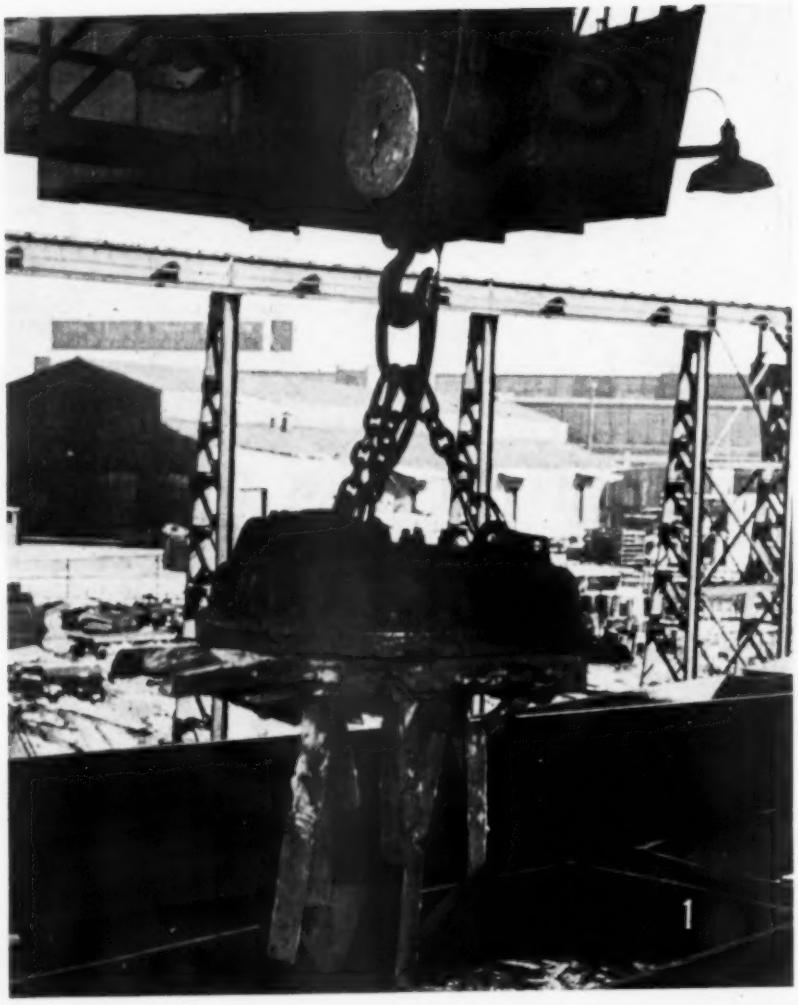
Fig. 1—Pouring line for cylinder blocks at Pontiac, Mich., gray iron foundry of Pontiac Motor Co. Pouring ladles are transported on electric hoists with push button control for raising, lowering and for travelling

Fig. 2—Howard Gratz filling a mold on the small castings line. Movement of the ladle up and down as well as forward and back is controlled with the right hand while tilting is performed with the left

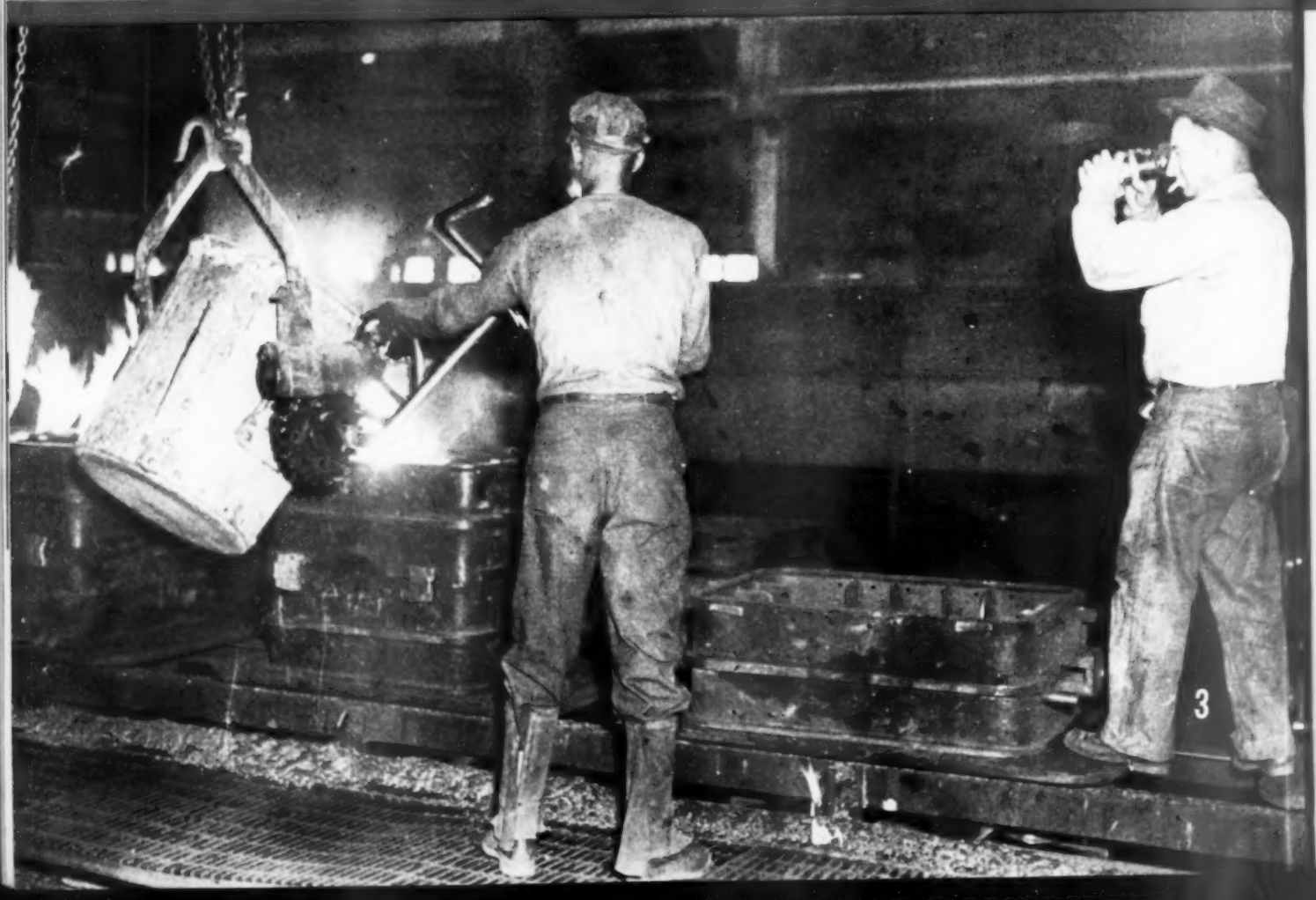
Fig. 3—Barrel cores are blown in four-part boxes, and this view of the production line shows the stripping operations by which the boxes are taken away from the cores, cleaned and reassembled preparatory to being returned to the core blowing machine

Fig. 4—View along the cylinder block line at the point where cores are being set in position and the cope molds are being made. Inner conveyor carries flasks to the molding machines while outer carries the molds. Rack between the two lines and just in front of the core setter contains gages employed for insuring proper location of cores





WILSON



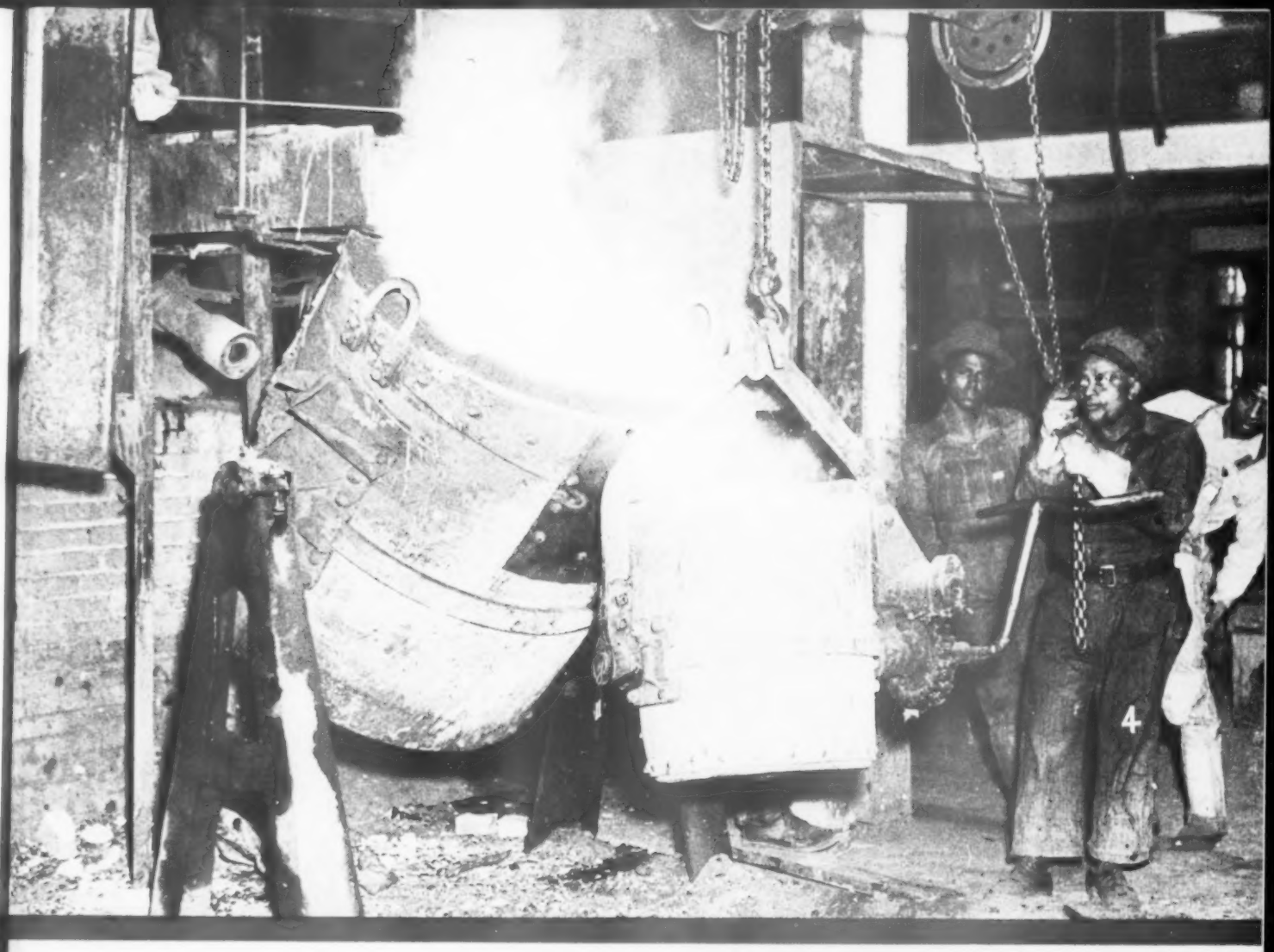


Fig. 1—Crane spanning storage yard handles incoming raw materials from railroad cars into proper storage bins at Wilson Foundry & Machine Co., Pontiac, Mich., division of Willys-Overland Motors Inc.

Fig. 2—Weighed raw materials constituting cupola charges are placed in bottom dump buckets and discharged into the cupola

Fig. 3—Checking the pouring temperature of the iron with an optical pyrometer is one of the numerous controls practiced

Fig. 4—Metal from the cupola runs continuously into a large mixing ladle to provide a more uniform iron in the pouring ladle

Fig. 5—Tapping a ladle of metal from a 10,000-lb capacity electric furnace

Relation of Mechanical Properties and Internal Stresses to Casting

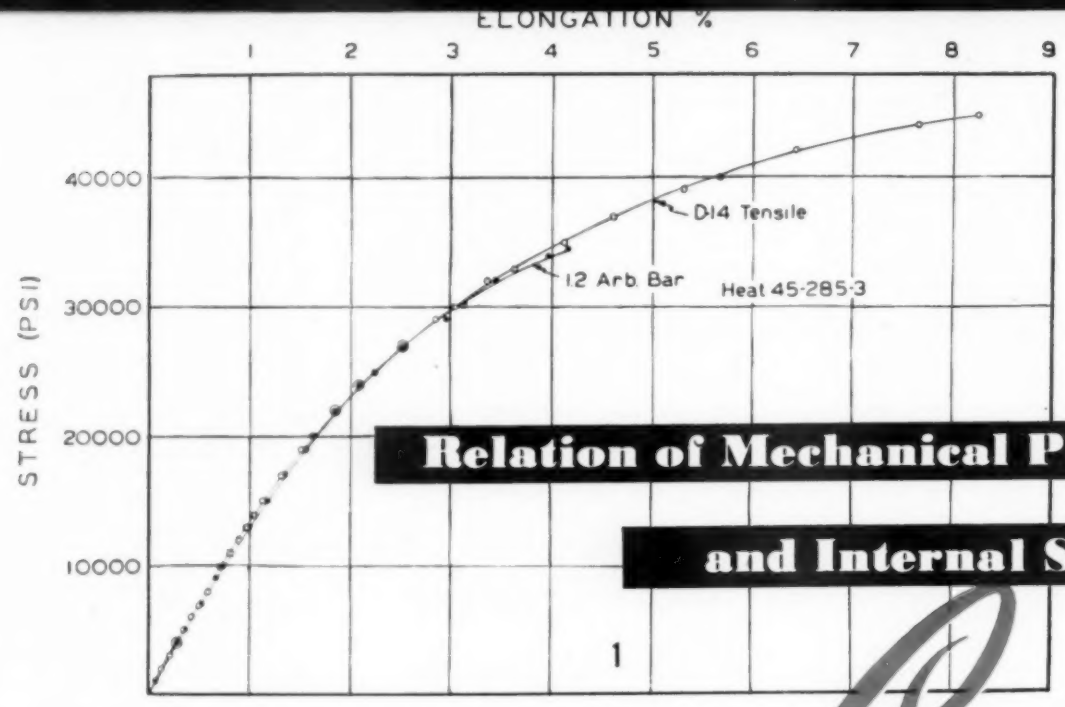


Fig. 1—Tensile stress-strain curves of 0.505 in. diam tensile specimens from 1.2-in. diam arbitration bar and properly risered specimen of same section

TC	Mn	P	S	Si	Ni	Mo
3.66	0.94	0.10	0.06	1.82	1.52	1.06

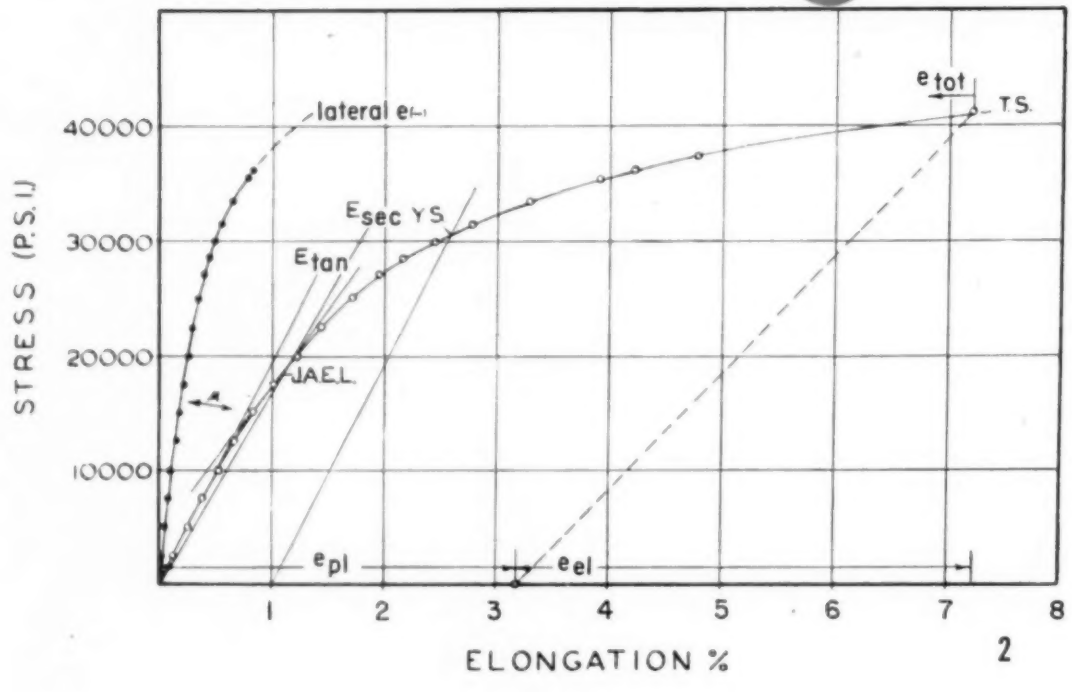


Fig. 2—Tensile stress-strain curve of a soft gray iron

TC	CC	GC	Mn	P	S	Si
3.48	0.84	2.64	0.54	0.27	0.10	0.77

Tensile strength ..... 41,100 psi
Total elongation (e_{tot}) 0.722%
Plastic elongation (e_{pl}) 0.318%
Elastic elongation (e_{el}) 0.404%

Yield strength (0.1% offset) (Y.S.) = 30,600 psi
Modulus of elasticity (E_{tan}) = 17.5 x 10^6 psi
Poisson ratio—(mu = elastic compressive strain / elastic tensile strain) = 0.23

Design

Experimental stress analysis and its application in the foundry field in order to further co-operation between casting designer and foundryman in the production of sound castings, are discussed by the author

By RICHARD A. FLINN
American Brake Shoe Co.
Mawah, N. J.

CO-OPERATION between the designer and foundryman has received some discussion at every recent foundrymen's convention of importance. After a few preliminary remarks, however, the talk has usually centered about the redesign of some particular part to a more easily cast shape. Much good has been done in this manner but we have not yet begun to attack the basic issue. Is the final design the most reliable and economical for the required service, or merely the easiest to make? To define the question more clearly, let us consider some examples.

In the aircraft industry, it is a well known maxim that in commercial planes, each part is worth its weight in gold. If a pound of weight can be removed safely from the motor or fuselage or any other part, the saving is $420 during the life of the plane because of the lowered dead weight and greater pay load. In this case the most economical part is almost always the lightest.

Not only the aircraft but the railroad and other industries are becoming increasingly conscious of the cost of moving dead weight. The choice is rapidly and properly becoming one of using lighter alloys in the old massive designs or using high strength ferrous materials in properly proportioned designs.

How does this affect foundrymen? Until recently, the gap between the designer and the foundryman has been too great to bridge except in dealing with small modifications of shape for easy production. On one side was the designer, armed with theoretical formulas derived from the theory of elasticity, asking questions of the foundryman who was equipped with only a few rudimentary test bars that in most cases were both unsound and unrepresentative of the casting. What values could the designer assign to the variables of modulus of elasticity, tensile strength, Poisson ratio, plastic and elastic elongation, endurance limit, and residual casting stresses. On the other hand, how good were his theoretical calculations based on the assumptions of the theory of elasticity?

There is now a field known as experimental stress analysis, that can bridge this gap if both foundryman and designer will co-operate. The foundryman's share of the load involved in this interesting problem is threefold:

1. To provide accurate data on the mechanical properties to be expected in any given casting (not merely a 1.2-in. arbitration bar.)
2. To control production so that these properties are characteristic of the casting as a whole, and not reduced by harmful internal stresses.

The designer's responsibility is to use these accurate figures in guaranteed castings in place of obsolete handbook data and to redesign to the most economical and reliable form. We must realize that the designer is also the customer to be convinced of the economics of this revision. The foundryman therefore should follow the casting through the evolution of the new design and assist in the last step, which is:

3. Stress measurement in service.

In the following sections we will discuss first, the determination of mechanical properties, especially the stress-strain curve; second, the measurement of internal stress in castings; and third, stress measurements in service and redesign.

Mechanical Properties—Which properties are most important to the designer? A casting fails either when actual rupture of the metal takes place or when distortion beyond clearances prevents the casting from operating properly. The designer wants to know, therefore, at what unit load fracture will take place, what the deflection will be up to this breaking load, and the portion of this deflection that will be permanent. In other words, under what stress does failure occur and what portion of this stress may be used safely? These questions can be answered by a careful determination of the complete stress-strain curve of the metal of the casting. (Fatigue failures may be analyzed in a manner similar to that discussed here by using endurance limit in place of ultimate strength.) Other design factors such as strength to weight ratio and shear modulus are usually functions of the more fundamental mechanical properties.

Let us consider then, the interpretation of the curve of a soft gray iron from the plate section of a railroad car wheel, Fig. 2. At low loads, that is, up to 10,000 psi, the stress-strain relationship is linear. The strain or elongation at this stress is mostly elastic. The ratio of stress to strain is 17,500 psi for 0.001-in. elongation in 1 in. (0.1 per cent).

At higher stresses, 30,000 psi for example, a small increase in stress causes a much greater elongation: In progressing from 30,000 to 40,000 psi, elongation changes from 0.24 to 0.64 or 0.4 per cent while from 0 to 10,000 psi, only 0.05 per cent or ⅛ of the elongation at higher load is obtained. Furthermore, a large proportion of the elongation at higher stress will be plastic or permanent. Two important facts that are not evident merely from a statement of tensile strength and modulus of elasticity are now apparent:

1. The modulus or stress-strain ratio applies strictly only up to approximately 20,000 psi in this material, and if higher proportions of the total strength are to be designed for, the full stress-strain curve should be con-

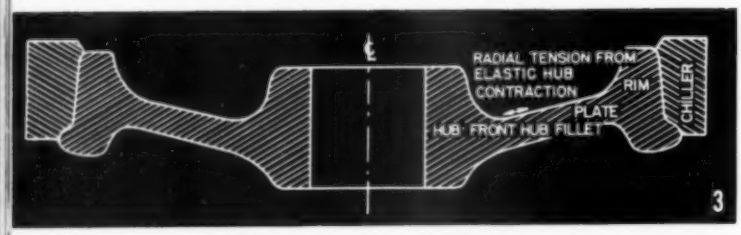


Fig. 3—Cross section of 750 lb car wheel

sulted. A value frequently used in steel to express the strength obtained before appreciable permanent set occurs is yield strength. This is the stress obtained at 0.1 per cent or other estimated set, and in this case it is 30,600 psi.

2. Considerable amounts of plastic deformation are encountered which may produce residual stresses in a casting upon removal of the load. When alternating tensile and compressive stresses are encountered, the complete cycle of strain should be determined, to interpret the behavior of the final casting.

Another determination which should be made occasionally to establish its relation to the stress-strain curve of a given structure, is Poisson's ratio. When a tensile bar is pulled and an increase in gage length takes place, an accompanying decrease in diameter occurs. A curve therefore may be obtained of the compressive strain versus stress, as shown to the left of the tension curve. The ratio of this compressive strain to the tensile strain gives Poisson's ratio. Plastic compressive strain is also shown across the specimen at high stresses, as in the case of plastic tensile strain in a longitudinal direction. In calculations of the deflection in a given application this compression at right angles to the principal stress is often of importance, as well as in the calculations of complex stresses. It should therefore be available to the designer.

What are the characteristics of gray iron stress-strain curves and how do they affect its use in castings? As an illustration, in Fig. 4 and Table I are shown the behavior of ½, 1, 3, and 6 in. "A" sections in tension.

All the specimens show approximately the same ratio of stress to strain up to 20,000 psi, that is, modulus of elasticity—about 20.0 x 16^6 psi. The heavier sections depart from this elastic behavior at lower loads than the lighter sections, and as a consequence exhibit lower yield strengths at 0.1 per cent offset. For applications where only a small amount of permanent set can be allowed, a lower design strength is necessary. As an example, the yield strength for the 6-in. section is 33,100 psi as compared with 46,300 psi for the ½-in. section.

Once the plastic range is reached, the heavier sections show greater ductility than the lighter sections. For example, at the breaking load the 6-in. section exhibits 0.42 per cent plastic strain as compared with 0.16 per cent plastic strain for the ½-in. section. For many applications which require a given strain rather than a given stress, the structure of the heavier section may be equal or superior to that of the higher strength, lighter sections. Most failures caused by heat cracking, or so-called thermal stresses, are really strain failures, that is, caused by lack of elongation.

The reason for the more plastic behavior of the heavier sections is evident from the combined carbon analyses and accompanying lower brinell hardnesses. A correlation of a wider range of combined carbon with mechanical properties in a high carbon gray iron is given in Fig. 5.

Before leaving this discussion on mechanical properties, it should be emphasized that sound castings are required to provide specimens for an accurate determination of the stress-strain curve. In Fig. 1 it is shown that in a relatively low shrinkage material only half the elongation obtained in a sound section is given by an unsound 1.2-in. arbitration bar. The principles of directional solidification have been thorough discussed in the past and should be applied to obtain sound test bars as well as sound castings.

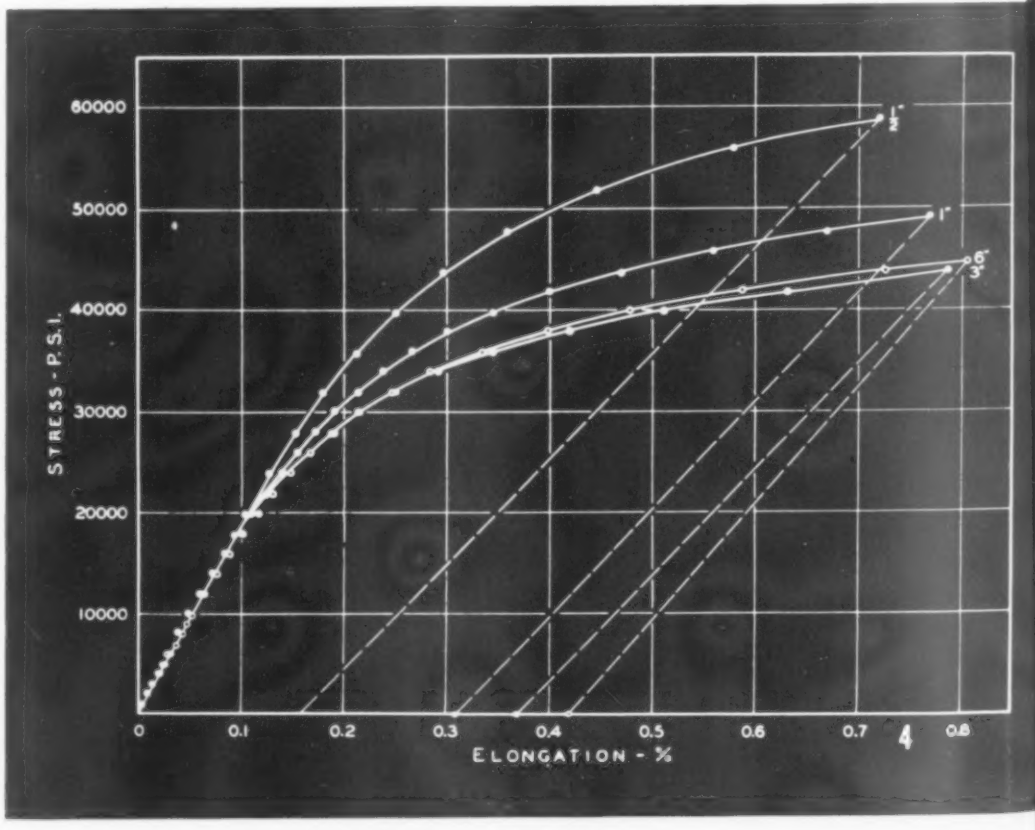


Fig. 4—Tensile stress-strain curves of pearlitic gray iron of different sections, 0.505 in. diam specimens

TABLE I—Tensile Properties of Pearlitic Gray Iron in Various Sections

Cstg.	TC	CC	Mn	P	S	Si	Tensile Strength, psi	Yield Str. (.1 offset) psi	Total Strain %	Elastic Strain %	Plastic Strain %	Modulus of Elasticity psi x 10^6	Bhn	Key	SSD
½" Y	3.01	.96	1.00	.11	.10	1.49	59000	46300	.72	.56	.16	20.0	255	M1020B	97
1" Y	3.01	.79	1.00	.11	.10	1.49	49500	37500	.77	.46	.31	19.7	232	M1023	101
3" Y	3.01	.72	1.00	.11	.10	1.49	44000	31800	.79	.42	.37	21.3	217	M1026B	103
5" Y	3.01	.78	1.00	.11	.10	1.49	44800	33100	.81	.39	.42	19.5	217	M1028B	105

Measurement of Internal Stresses—The first step in correlating mechanical properties with design, namely measurement of the constants of different gray irons, has just been described. The second step is to make certain that these properties are available to the customer in every casting shipped. Processing control may insure that a test specimen cut from a casting will be 50,000 psi tensile strength, but if residual stresses within the casting are 49,000 psi tensile, the part may be easily broken. Another reason for stress analysis is to provide dimensional stability in precision tools. Residual stress is always the result of an elastic strain in the casting which can be relieved by machining and cause deformation of another already machined surface.

We will review only the SR-4 gage method, although "stress-coat" is quite useful for preliminary stress surveys. The gage operates on the principle that if a wire is stretched, its electrical resistance increases, as would be expected from the greater length and smaller cross section. Conversely, if the wire is compressed and supported to prevent bending, the resistance will decrease. Therefore, if a wire is cemented to a tensile specimen with an insulating material, the elongation of the specimen can be measured by the change in resistance since the ratio of resistance change to length change is known. Furthermore, if a resistance reading is taken when the specimen is at a certain unknown stress and then the load is released and another reading taken, the difference between the readings will indicate the change in stress in the specimen.

This is the method for measuring the internal stress in a casting. Wire gages are cemented at critical locations where high internal stress is suspected, and resistance readings are taken. The casting is then sectioned to relieve the internal stress and the resistance of the gage is again determined. The difference between the reading under stress and after stress relief indicates the internal stress. A duplicate casting may be given a stress relief heat treatment if the internal stress is considered dangerous, and this casting should then be checked to determine the efficacy of the heat treatment.

Now that the measurement has been discussed, let us review the sources of internal stress in castings. The reason for the formation and relief of internal stresses are perfectly straightforward. We will see that the casting process can be vastly more favorable to the production of a stress-free product than either welding or forging if a few simple facts are understood by the shop superintendent. Only two fundamental principles known to every metal worker need be reviewed:

1. The elastic behavior of iron when cold and plastic behavior when hot. From room temperature to approximately 1000 F, that is, up to dull red heat, iron and steel are predominantly elastic. If a moderate stress is applied, for example 10,000 psi, the specimen will stretch elastically and then spring back if the load is replaced. At red heat, iron becomes predominantly plastic and flows at low stresses.

2. The expansion during heating and contraction during cooling. The phenomena of expansion and contraction are too familiar to require review, but the quantitative effects are little appreciated. A pearlitic iron will contract 0.00076-in. per

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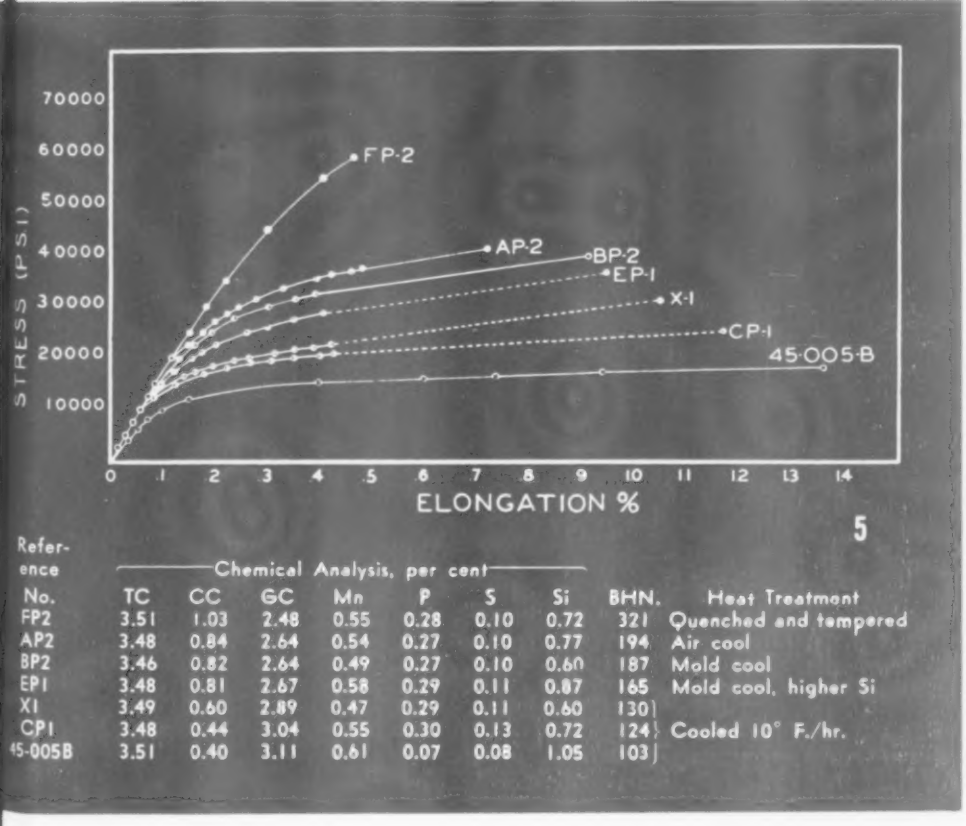
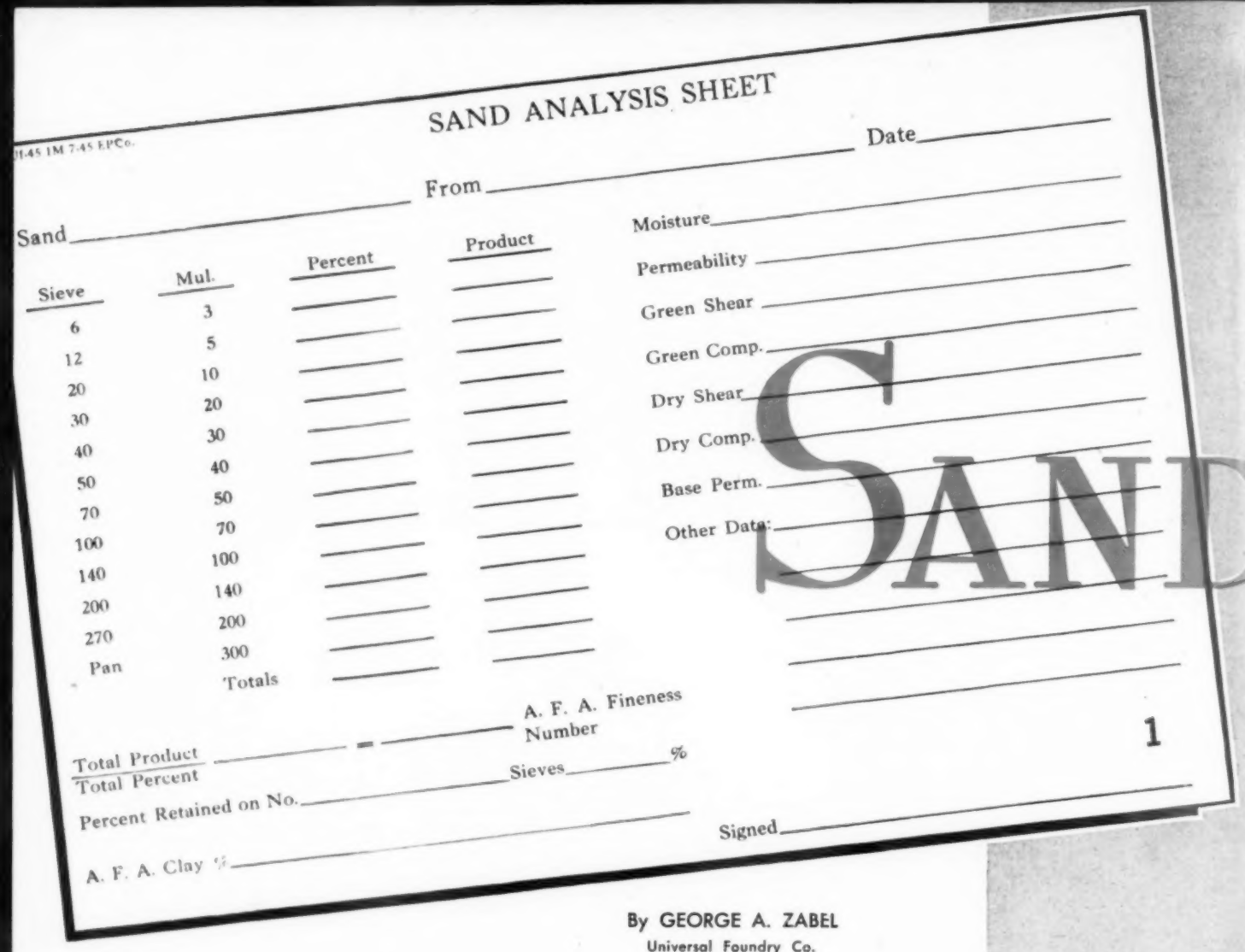


Reference No.	Chemical Analysis, per cent TC	CC	GC	Mn	P	S	Si	BHN.	Heat Treatment
FP2	3.51	1.03	2.48	0.55	0.28	0.10	0.72	321	Quenched and tempered
AP2	3.48	0.84	2.64	0.54	0.27	0.10	0.77	194	Air cool
BP2	3.46	0.82	2.64	0.49	0.27	0.10	0.60	187	Mold cool
EP1	3.48	0.81	2.67	0.58	0.29	0.11	0.87	165	Mold cool, higher Si
X1	3.49	0.60	2.89	0.47	0.29	0.11	0.60	130	
CP1	3.48	0.44	3.04	0.55	0.30	0.13	0.72	124	Cooled 10° F./hr.
45-005B	3.51	0.40	3.11	0.61	0.07	0.08	1.05	103	

Fig. 5—Effect of combined carbon on tensile stress-strain curve



SAND ANALYSIS SHEET

11-45 1M 7-45 EPCo.

Date

From

Sand

Sieve	Mul.	Percent	Product
6	3		
12	5		
20	10		
30	20		
40	30		
50	40		
70	50		
100	70		
140	100		
200	140		
270	200		
Pan	300		
	Totals		

Moisture

Permeability

Green Shear

Green Comp.

Dry Shear

Dry Comp.

Base Perm.

Other Data:

Total Product / Total Percent = A. F. A. Fineness Number

Percent Retained on No. Sieves %

A. F. A. Clay %

Signed

1

SAND

By GEORGE A. ZABEL

Universal Foundry Co.
Oshkosh, Wis.

THE desire to produce better quality castings, to better meet the requirements of the customer, calls for high-type controls. Not the least of these is sand control. Quality and control go hand in hand. They are not separable. Once the elements which go up to make a control procedure have been established, and are adhered to, the matter of quality cannot go far astray.

Control begins with a job record. Each job coming into our shop is started out with a "Job Specification" card. The specification card contains essential information necessary to obtain a good quality casting. The kind of sand—its characteristics, kind of facing, mold hardness, etc., becomes a part of this record. Once established, such record eliminates or holds to a minimum, future doubt and difficulty. The record becomes especially useful on jobs which have been out of the sand for considerable lengths of time. A reproduction of this card is shown on page 152.

Included in the general specifications for materials and operations is a section set up for purchased sands. Engineering specifications have been established for all sands coming into the shop. Such specifications have been written up by the quality control department in co-operation with the general superintendent and the department heads concerned.

After formulation of the desired specifications, a copy is given to the purchasing department for guidance in purchasing, complaint, or rejection.

Most of the molding sands used by this plant are synthetic, or partly so. Natural sands are used in the very light gray iron and nonferrous sections of the foundry.

Only two base sands are used for the construction of synthetic sands. The grain distribution is such that both sands can be used for green sand construction as well as for cores; core sands, getting into the continuous unit sand and heaps, do not interfere

CONTROL

2

Fig. 2—Casting finish is important in air-cooled cylinder work of the type illustrated here

with the grain distribution of those sands. The engineering specifications for one of the base sands (silica sand) is as follows:

1. Grain distribution 70-80% on Nos. 50, 70, and 100 sieves. Other grain to be distributed so as to give 55-60 AFA fineness number.
2. Clay content less than ½%. More than ½% clay will be reason for rejection.
3. Must be free of lime.
4. Must be dried but arrive at our plant at less than 100 F.

Reference was made to a semi-synthetic sand. One such sand is purchased for introduction into the continuous molding unit at the shakeout grid. The purpose of its introduction is to help maintain adequate sand volume in the unit, and it is easier to control than is the addition of wholly raw sand. This sand is a 7 per cent natural clay sand to which has been added 10 per cent fire clay. The combination is prepared for use by mulling.

All sands coming into the shop are bought on prescribed specifications and are subjected to test upon arrival. The results of test are recorded on the sand analysis sheet shown in Fig. 1. The form is filled out in duplicate—one is routed to the department concerned, the other becomes a laboratory record. Except in unusual cases, such sands are tested prior to unloading. It can be pointed out that reliable suppliers have continually made a sincere effort to meet the specifications required. It is rarely necessary to reject sand lots.

In critical times, and when tests show minimum variation from standard, the molding and core departments will use alternate mixes. For example, in the core department, if the clay content is higher than desired, more oil is added to the mixes in accordance with results obtained from previous testing. Where sands are coarser than desired, and casting finish is important as in air-cooled cylinder work such as shown in Fig. 2, a silica flour may be added.

Testing indicates what moves should be made in order to maintain peak quality. The same moves can be made by the experienced foundryman after witnessing poor quality or defective castings, but from at least a production angle it is a cheaper and more scientific approach to eliminate the possibility of trouble at the outset and avoid the need for correcting it afterward.

The defect on the casting shown in Fig. 3 could have been prevented by proper test procedures. The sand which caused the defect was later tested and found to contain 18 per cent clay and 18 per cent combustible matter.

At prescribed intervals the following tests are made on sands in production: Moisture, green and dry compression strengths, permeability, clay wash out, sieve, combustible, hydrocarbon (on proprietary material used for facing), core tensile, and base permeability.

All tests, except the combustible and the special hydrocarbon tests, are performed in accordance with AFA procedures described in the *Foundry Sand Testing Handbook*. The only deviation from standard AFA procedure is in the clay wash-out operation, and then only when quick clay checks are necessary. Siphoning is eliminated, but the water is carefully poured off after the 10 and 5 minute settling periods. A fair degree of accuracy is obtained if the pouring off is performed carefully. A section of the control laboratory is shown in Fig. 4.

For quick clay approximations on new sands of low clay content, the use of the oil sample bottle test is resorted to. This test gives reasonably good results on sands of less than 5 per cent clay content; (*Please turn to page* 150)

Fig. 3—Defect in this casting could have been prevented by proper sand test procedures

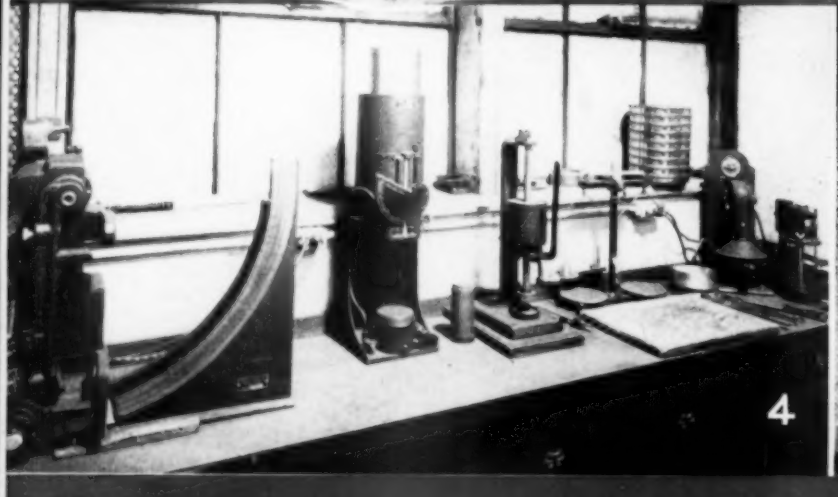


Fig. 4—One section of the company's sand control laboratory

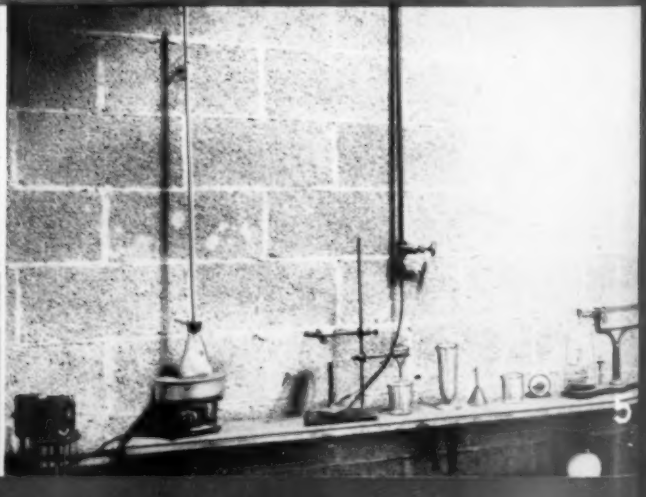
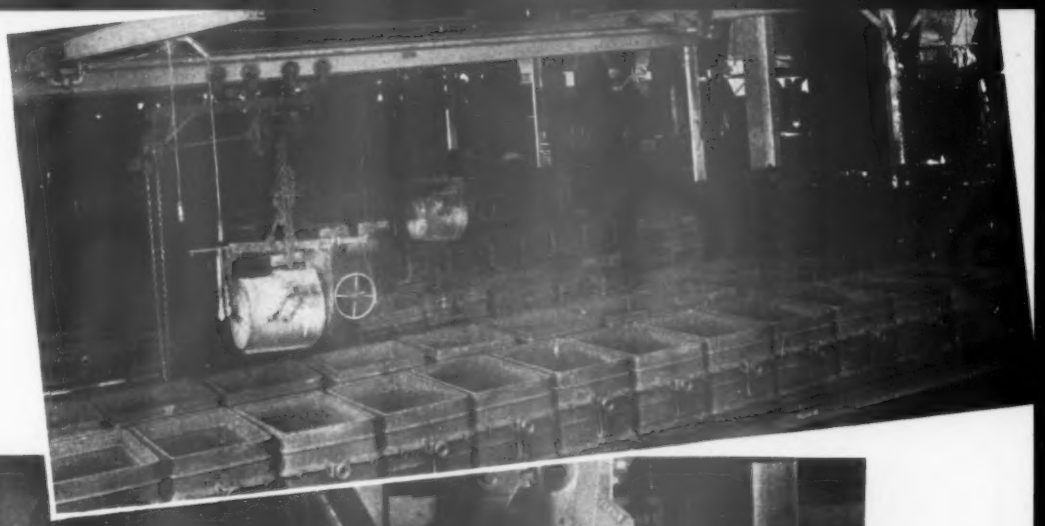
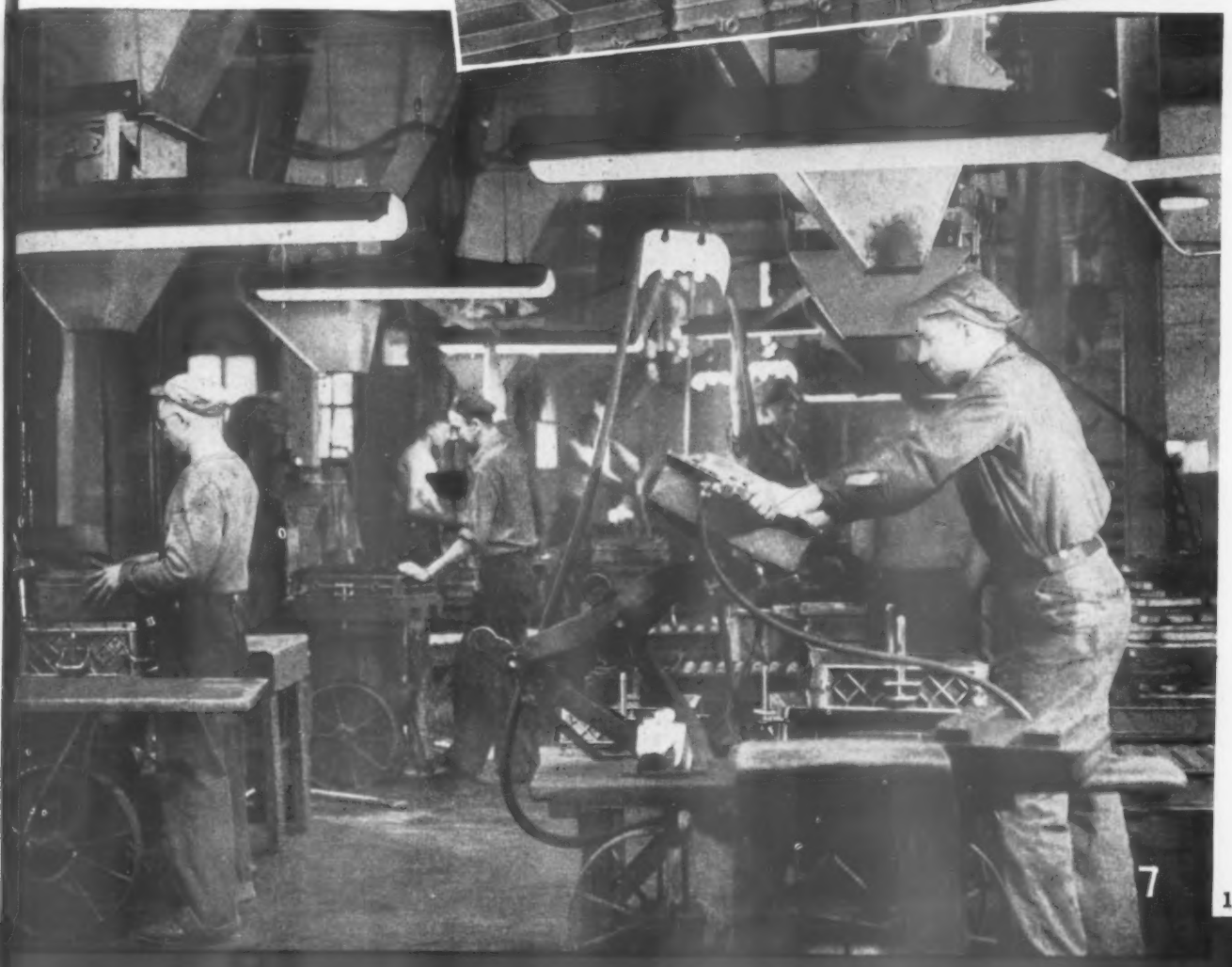


Fig. 5—Equipment used to test molding sands for combustible matter

Fig. 6—Graph record of moisture, green compression and permeability is posted near the muller operator

Fig. 7—Portions of the central sand distribution system are shown at right and below





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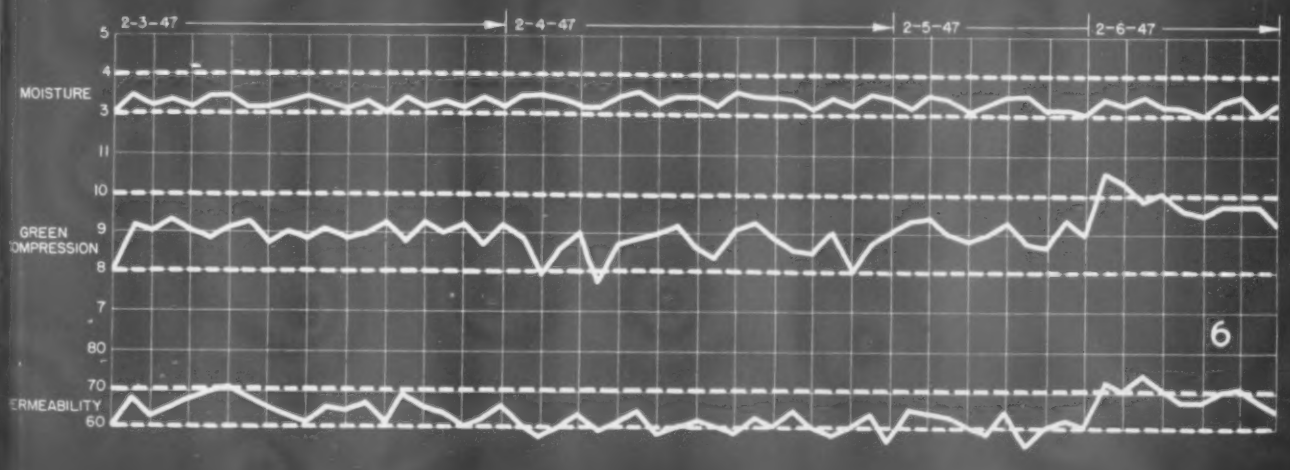

FOUNDRYMEN TO SPONSOR Engineering

Courses in foundry technology and foundry metallurgy to be initiated in five leading engineering colleges and universities through sponsorship and support of newly incorporated Foundry Educational Foundation

FOR many years, leaders in the foundry industry have recognized the need for greater emphasis on the training of technical engineers in the production and application of castings. The problem has been given intensive study during the past two years by the Joint Ferrous Foundry Educational Committee, with the result that a definite educational program has been developed.

According to a recent announcement of the committee, the Foundry Educational Foundation has been incorporated as a nonprofit organization for the raising of necessary funds from all interested in the problems of castings production, and the sponsorship and support of courses in foundry technology and foundry metallurgy in five leading engineering colleges and universities.

The Joint Ferrous Foundry Educational Committee is sponsored by the Gray Iron Founders' Society, the Malleable Founders' Society and the American Foundrymen's Association. Anthony Haswell, president, Dayton Malleable Iron Co., Dayton, O., John M. Price, president, Ferro Machine & Foundry Inc., Cleveland, and P. E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, O., have headed the committee of which Mr. Haswell is chairman. Active on this committee have also been R. W. Crannell, vice president, Lehigh Foundries, Inc., Easton, Pa., Frank S. O'Neil, vice president, Link-Belt Co., Indianapolis, Prof. P. E. Kyle, Cornell University, Ithaca, N. Y., F. G. Sefing, International Nickel Co., New York, S. C. Wasson, manager, Chicago Works, National Malleable & Steel Castings, Chicago, A. C. Denison, president, Fulton Foundry & Machine Co., Cleveland, H. A. Deane, vice president, American Brake Shoe Co., New York, W. M. Caldwell, assistant executive vice president, Gray Iron Founders' Society, Cleveland, H. F. Scobie, educational assistant, American Foundrymen's Association, Chicago, and (*Please turn to page* 262)

Fig. 1—Foundry laboratory work at Massachusetts Institute of Technology

Fig. 2—Bird's-eye view of main campus, University of Cincinnati

Fig. 3—Metallurgy building, Case School of Applied Science

Fig. 4—Part of the foundry at University of Wisconsin

Fig. 5—South wing of Olin Hall, Cornell University

g Training

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4

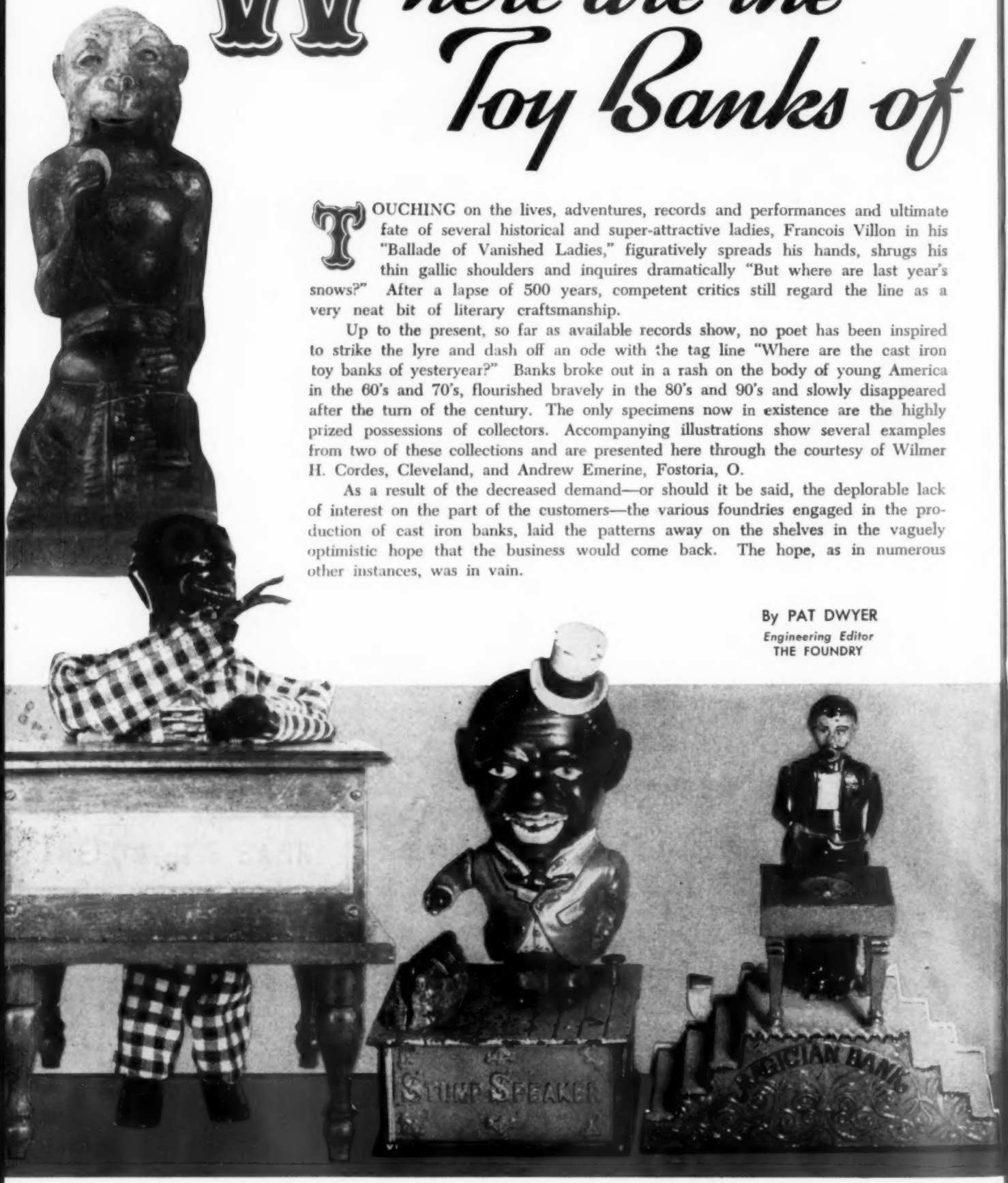
Where are the Toy Banks of Yesteryear?

TOUCHING on the lives, adventures, records and performances and ultimate fate of several historical and super-attractive ladies, Francois Villon in his "Ballade of Vanished Ladies," figuratively spreads his hands, shrugs his thin gallic shoulders and inquires dramatically "But where are last year's snows?" After a lapse of 500 years, competent critics still regard the line as a very neat bit of literary craftsmanship.

Up to the present, so far as available records show, no poet has been inspired to strike the lyre and dash off an ode with the tag line "Where are the cast iron toy banks of yesteryear?" Banks broke out in a rash on the body of young America in the 60's and 70's, flourished bravely in the 80's and 90's and slowly disappeared after the turn of the century. The only specimens now in existence are the highly prized possessions of collectors. Accompanying illustrations show several examples from two of these collections and are presented here through the courtesy of Wilmer H. Cordes, Cleveland, and Andrew Emerine, Fostoria, O.

As a result of the decreased demand—or should it be said, the deplorable lack of interest on the part of the customers—the various foundries engaged in the production of cast iron banks, laid the patterns away on the shelves in the vaguely optimistic hope that the business would come back. The hope, as in numerous other instances, was in vain.

By PAT DWYER
Engineering Editor
THE FOUNDRY



This is the first of two articles recounting the rise and fall in popularity of the cast iron toy bank. The second installment will be presented in an early issue

Yesteryear?

Later in a general cleanup of the premises by sons and grandsons, the accumulation of old patterns and castings, covered with rust and foundry dust, was gathered up by the yard gang and shoveled into the cupola. Many patterns were brass castings. Some of these were dumped into the cupola with the others on the plea that "All that

The comparatively few remaining cast iron toy banks in this country, typified by the various examples shown here, are now the property of enthusiastic collectors. In their heyday, the middle and closing years of the past century they shared space with the family album and the mustache cup in practically every household. Then as mysteriously as the demand had grown through the years, it died down and finally disappeared. It is interesting to note that the penny banks, highly popular in the East and Middle West, practically were unknown in the Far West where the inhabitants favored silver and gold coins and rarely condescended to use any coin less than 2 bits

there junk stuff looks alike, and for our skimpy wage we ain't no metallurgists." A certain amount was salvaged and incorporated in the crucible charges.

In the so-called good old days, brass and bronze were synonomous terms applied indiscriminately to any combination of copper, tin, lead and zinc. Any metal with a yellow surface when machined or fractured, was brass. When the color was a little deeper the metal was accepted as bronze. Down to this day the notorious laxity of foundry nomenclature is illustrated in the fact that any shop where alloys of copper, tin and zinc are cast is referred to as a brass foundry.

Many companies with a desire for accuracy include "Brass and Bronze" in the sign over the door and on their letterheads. And yet when the inquiring stranger or idle tourist points to the plant and asks the native son what manner of place it is, the obliging native son cheerfully and ignorantly replies that it is a brass foundry. The foregoing digression has taken us too far afield, a common fault of digressions. Better stick to the straight and narrow until it is time to come back later to a reference to the actual making of brass patterns.

On the comparatively few occasions when dear little Abigail, Patience, Prudence, Priscilla or Penelope earned or was given a penny, she was faced with a problem as

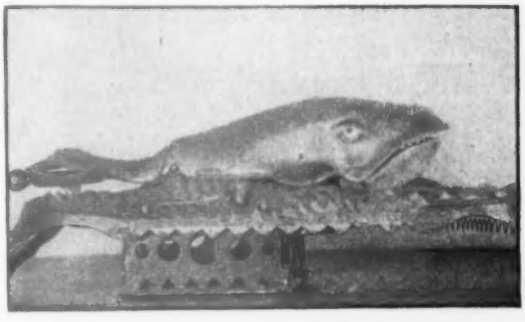
serious as that faced by the Priscilla of a former generation. Longfellow's Priscilla only had to choose between Miles Standish and John Alden. Our little friend had the alternative of kissing her penny goodbye and dropping it into a hold-fast bank, or of taking it fairly in hand and going down the street on a wild spending spree. With cash in hand she was privileged to look at peppermint lozenges, licorice sticks, jaw breakers, wee china dolls, lumps of spruce gum and brilliantly colored pencils. If she was of a thrifty disposition, as small maids of the period sometimes were, either through hereditary influence or extraordinary endowment, or—more likely—through parental coercion, the money would join other small coins in her savings bank. If this piece of household equipment happened to be one of the ingeniously constructed mechanical banks of the period, the little lady probably consoled herself with the reflection that the performance of the animated figure which flipped the penny out of sight, was well worth the price of admission.

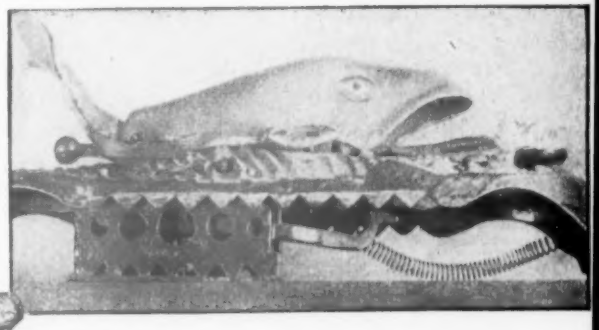
From a strictly neutral standpoint it must be admitted that many authorities, self-constituted and otherwise, claim that the desire to collect and preserve is a natural tendency of the human race. They are not surprised to find many helps to young hoarders take the form of toys. Most famous helps of this character are the mechanical banks of 19th century America. These are closely allied to other forms of money boxes, and other toy containers for candy, marbles and countless other items from the simple and elementary treasures of childhood.

Stray items of evidence pop up every now and again to show that parents and other adults in their supreme wisdom have sought to direct the hoarding tendencies of children into monetary channels almost since the beginning of time. Surviving receptacles for storing the small coin of the realm remain from the day of ancient Greece. These early types of coin preservers were pottery, usually in the shape of urns, From an early date pottery and porcelain *still* banks were common throughout western Europe. The first known mechanical bank, where the insertion of a coin caused a motion of an attached figure, is an alms box of China's Han dynasty, from just before the Christian era. The Aztec civilization also developed coin depositories for children.

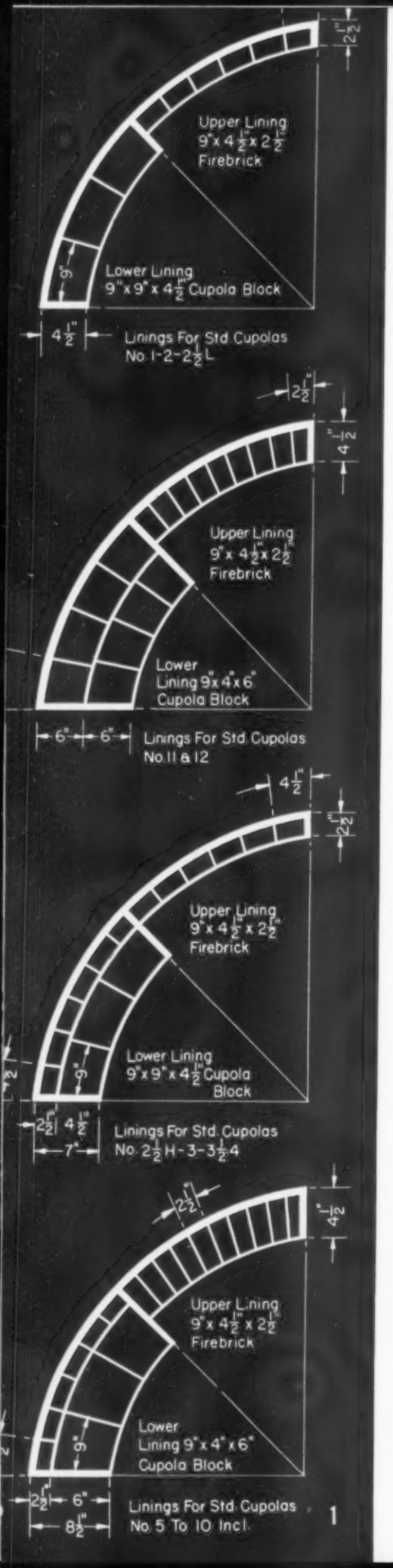
Penny banks made their first appearance in America around 1793 along with the first large copper penny. Their popularity is credited by most authorities to Benjamin Franklin's famous maxims concerning thrift, widely circulated in *Poor Richard's Almanac*. Another contributory factor, undoubtedly, was the early troubles with U. S. currency and the tendency to favor hard money. Pottery, glass and tin banks were prevalent throughout the early years of the Republic. They were concentrated especially in New England, where thrift was to become a virtue almost rivaling the worship of God. So pronounced did the saving habit become with young and old alike that in cartoon and comment at home and abroad, the typical Yankee was pictured and labeled as a "Pinchpenny."

The social historian would gain much through a study of old letters and documents referring to the subject of thrift. "A penny saved is a penny earned" and "waste not—want not" become the frequent admonitions of youth. The savings bank was a national habit and contributed in no small way to the financial independence of the nation. Nowhere else in the world was the toy bank nearly as popular as in America. A foreign exporting agent of the 1850's commented "The little tin bank always sells there, for it accords well with the grasping character of the race." Already we in America were becoming known for "squeezing the eagle until it (*Please turn to page* 286)





In addition to the wide range of subjects, ingenuity and originality of the designers is reflected in the foundry technique and in the adaptation of mechanical movements for transferring the pennies to the interior. The illustration to the left shows part of the Wilmer H. Cordes collection displayed in the window of a downtown Cleveland bank



By RAY A. WITSCHEY
A. P. Green Fire Brick Co.
Chicago

DURING the past several years the need for maximum production, with its accompanying metallurgical problems has kept all operators more than busy. To achieve this production many, no doubt, have overlooked, or at least shelved, considerations of refractory practice for those things which appeared more urgent.

In this postwar era perhaps we can well examine this problem again with the idea of achieving a standardization of practice, a lowering of labor costs, a lowering of refractory costs, and the accomplishment of better operating practice.

This discussion will be an attempt to summarize the practices employed and to point out those considerations which it is believed will lead to better practice.

The refractory lining of a new cupola has been fairly well standardized by the cupola manufacturer. Fig. 1 shows the types of lining generally employed. The 4½-in. lining is employed only in the smaller sizes. In general it is not desirable to have a single lining in the lower section of the cupola. The operator planning on small tonnages and a low melting rate may find it practical and economical to install a slightly larger unit to provide for a 7-in. or double lining for the extra safety factor obtained and to permit more flexibility. A 7-in. lining is much to be preferred in the smaller sizes and provides a satisfactory lining in some of the intermediate sizes. The 8½-in. lining is for all practical purposes referred to as a 9-in. lining since the 2½-in. backing lining follows the shell contour as a series of chords rather than as a true circle.

Sometimes the 9-in. lining is converted to a 10½, or more practically referred to as a 11-in. lining by backing up the 6-in. service lining with a 4½-in. course made up of arches and wedges laid up in the same manner as indicated in the lining above the charging door.

Change Thickness of Brick Lining

The method for laying up a 12-in. lining is indicated and this can be converted into 15-in. lining by replacing either the 6-in. backing lining or the 6-in. service lining with 9-in. cupola blocks. The same results could be accomplished by backing two 6-in. courses of cupola blocks with a 2½-in. course of standard brick. In some very large installations an 18-in. lining has been employed.

It should be pointed out that virtually any lining thickness or refractory combination can be obtained by the use of standard cupola refractories. The standard shapes which have been adopted are indicated in Figs. 2 and 3. These are summarized as in "Simplified Practice Recommendation R154-38" of the National Bureau of Standards.

These adopted standards in conjunction with the standard series of standard shapes available from the refractory manufacturer make possible any thickness of refractory lining. Virtually any refractory structure or combination can be assembled with shapes that are standard.

The lining above the charging door is either a 2½-in. lining or a 4½-in. lining as indicated in Fig. 1. Further mention will be made of these practices in the subsequent discussion of refractory service conditions.

In any discussion of refractory service conditions, it is convenient to divide the cupola into four zones. These zones can be accurately defined and the service conditions in each zone can in this way be specifically studied.

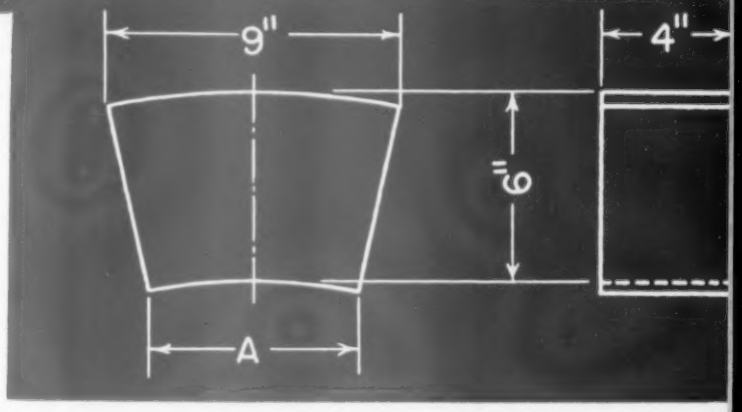
Fig. 1 (left)—Conventional methods employed for lining cupolas

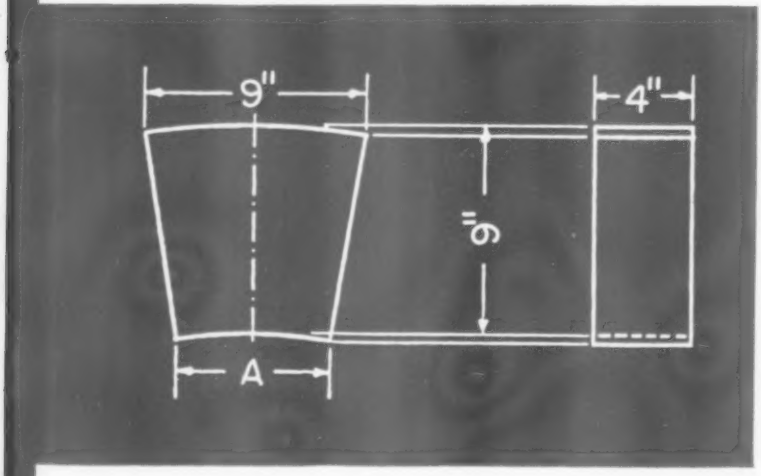
Fig. 2 (right)—Standard cupola refractory shapes. These are from "Simplified Practice Recommendation R 154-38" of the National Bureau of Standards. Tables give numbers and dimensions of standard blocks

Cupola Refractories

This is the first of two articles covering a paper dealing with cupola refractory practice as it affects costs and operations. It was presented by the author before the Chicago Regional Foundry Conference, Nov. 21, 1946

Block number	Dimension A Inches	Diameter—Inside Inches	Diameter—Outside Inches	Number of brick to circle
30-42	6 7/8	30	42	15
36-48	6 3/4	36	48	17
42-54	7	42	54	19
48-60	7 1/8	48	60	21
54-66	7 3/8	54	66	23
60-72	7 1/2	60	72	26
66-78	7 5/8	66	78	28
72-84	7 11/16	72	84	30
78-90	7 13/16	78	90	32
84-96	7 7/8	84	96	34
90-102	7 15/16	90	102	36
96-108	8	96	108	38
102-114	8 1/16	102	114	40
108-120	8 3/16	108	120	42
114-126	8 5/16	114	126	44
120-132	8 7/16	120	132	46
123-135	8 1/2	123	135	48

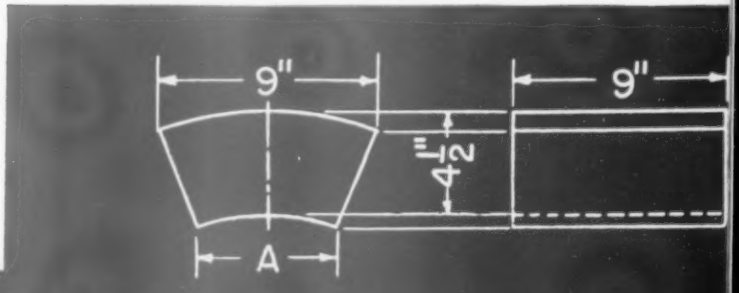




Block number	Dimension A Inches	Diameter—Inside Inches	Diameter—Outside Inches	Number of brick to circle
48-66	6 7/8	48	66	23
54-72	6 3/4	54	72	26
60-78	6 11/16	60	78	28
66-84	7 1/16	66	84	30
72-90	7 1/16	72	90	32
78-96	7 1/16	78	96	34
84-102	7 1/16	84	102	36
90-108	7 1/16	90	108	38
96-114	7 1/16	96	114	40
102-120	7 1/16	102	120	42
108-126	7 1/16	108	126	44
114-132	7 1/16	114	132	46
117-135	7 1/16	117	135	48
120-138	7 1/16	120	138	49
123-141	7 1/16	123	141	50
126-144	7 1/16	126	144	51
132-150	7 1/16	132	150	53
138-156	7 1/16	138	156	55
144-162	8	144	162	57
150-168	8 1/16	150	168	59

Note: Standard sizes have been adopted by the American Refractories Institute for other brick in the 9-inch series which meet special requirements not satisfied by the sizes listed above.

Block designation	Dimension A Inches	Diameter—Inside Inches	Diameter—Outside Inches	Number of brick to circle
A	5 3/4	16	25	9
B	6 1/16	21	30	11
C	6 3/4	27	36	13
D	6 11/16	30	39	14
E	7 1/16	40	49	18
F	7 5/16	51	60	21
G	7 11/16	60	69	24
H	8	73	82	29



These zones in order of decreasing severity of service are: 1. The melting zone. 2. The crucible (sometimes called the hearth or well.) 3. The charging zone. 4. The zone above the charging door.

The melting zone is the crux of the cupola refractory problem. Repairs are necessary every day. These repairs may comprise comparatively small replacement of the refractory lining in heats of short duration. With increase in severity of service, correspondingly more extensive repairs are necessary, particularly so in heats of long duration in which case complete replacement of the refractories is required. In some of the larger installations operating over long periods of time, water cooling is being employed to maintain the refractory lining.

The melting zone is defined as that section extending from the tuyeres up to and including the section where melting begins. This will, of course, vary with the depth of bed, the velocity of the blast, and the nature of the charge. Even in this zone some variation in the type of attack exists since near the top of this zone the primary course of failure is due to actual melting and temperature, but as the tuyeres are approached this condition is further accentuated by the complexities of slag attack which will be discussed later.

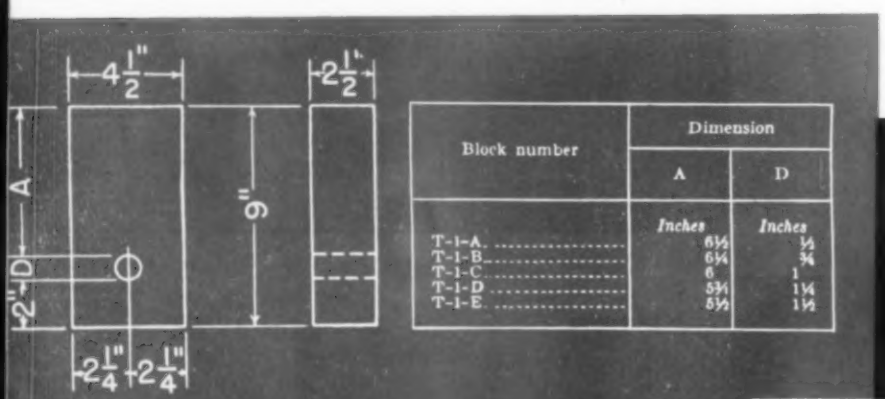
For all practical purposes the causes of failure may be summarized as: Thermal, chemical and mechanical.

High operating temperatures (estimated as high as 3100 F) alone induce softening and refractory deterioration. Such temperatures, with the accompanying softening of the refractories, facilitate the more rapid action of the chemical and mechanical phases of attack. The thermal treatment likewise brings about structural changes in the refractory which accentuate thermal and structural spalling. In any consideration of temperature we must, of course, consider the broader phase of heat treatment, which is a function of time as well as temperature.

Chemical attack, or what might be called slag attack, is occasioned by the formation of the slags by interaction of limestone, ash in the coke, and sand or dirt introduced with the charge. This slag attack is further complicated by the action of the iron (and other) oxides existing (or formed) and, of course, the fluxes used to obtain certain operational and metallurgical advantages. During all of this action the refractory lining itself is entering the slag and affects its final composition.

The mechanical attack comprises the abrasive action of descending charge against refractories in the pyroplastic form as well as the entrainment concurrent with the blast. Even mechanical spalling may be a factor.

To understand better these total factors of refractory destruction in melting zone service, it is desirable to consider briefly the nature of cupola slags.



Block number	Dimension	
	A	D
	Inches	*Inches*
T-1-A	6½	½
T-1-B	6¼	¾
T-1-C	6	1
T-1-D	5¾	1¼
T-1-E	5½	1½

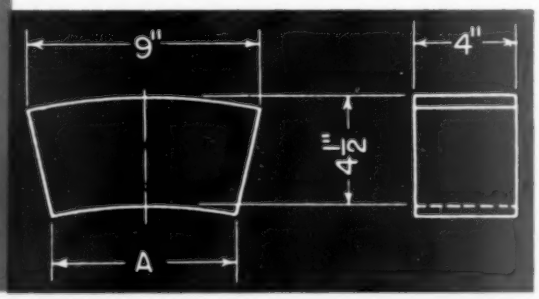
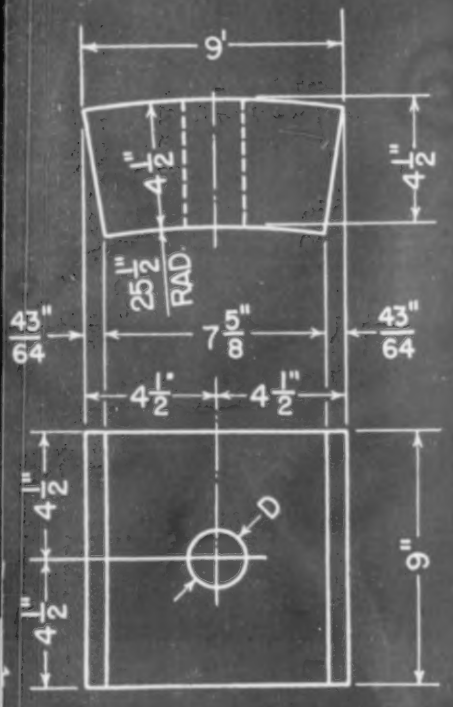
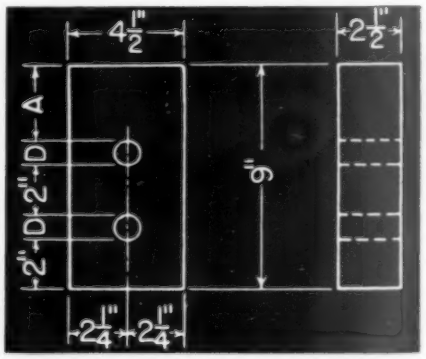


Fig. 3—Dimensions of additional refractory shapes and slag hole blocks (National Bureau of Standards)

Block number	Dimension A	Diameter		Number of brick to circle
		Inside	Outside	
	Inches	*Inches*	*Inches*	
4½-27	6¾	27	36	13
4½-32	7⅛	32	41	15



Block number	Dimension D	Diameter	
		Inside	Outside
	Inches	*Inches*	*Inches*
S-1-A	1½	51	60
S-1-B	2	51	60



Block number	Dimension	
	A	D
	Inches	*Inches*
T-2-A	4	½
T-2-B	3½	¾
T-2-C	3	1
T-2-D	2½	1¼
T-2-E	2	1½

If a cupola were operated with only metal and coke (a not to be recommended practice) the sand, dirt, and oxides of the metal, in conjunction with coke ash oxides together with part of the refractory lining would fuse together, combining in thermochemical fashion to form a viscous or glassy mass called slag. This is sometimes referred to as a natural or primary slag. As such it would prove difficult to handle. Its fusion temperature would be high and its viscosity would be such that it would tend to freeze and bridge over the tuyeres.

It might be suggested that slags of this type would be less severe on refractories but in such physical form such a slag would slow up melting, necessitate excessive (and variable) blast and cause excessive oxidation. Such results contribute to refractory trouble.

This is overcome by adding fluxes such as limestone, dolomite, fluorspar, soda ash, etc. As such these are active fluxes in relation to the refractories conventionally used. Added in controlled amounts, however, they lower the fusion temperature, make the slag more fluid, improve the melting conditions, accelerate the rate of combustion and, in short, permit better metallurgical control and the operator obtains better castings. As such the attack on refractories would be minimized. Attack, however, would again become more excessive as these flux additions were increased.

Slags Vary Widely in Composition

It will at once be apparent that the type of castings required by the industry, the variation in raw materials and the metallurgical considerations imposed, make for slags of a wide range as regards chemical composition, physical characteristics and refining or metallurgical value.

Slags may be acidic or basic; they may be fluid or viscous; they may be oxidizing or reducing. The nature of the slag will determine slag volume or the quantity of slag necessary. This, too, influences the operation of the cupola and, of course, enters into cost consideration, to say nothing of the variable attack on refractory linings.

Perhaps the more general practice followed by operators today is to approach the minimum requirements of flux to maintain a fluid slag conducive with adequate control and good operation. Such practice results in the formation of an acid slag.

The analyses of cupola slags vary considerably, but from literature references and analyses we have observed in practice the range in compositions would probably be as follows:

Silica	40 to 50%
Lime	15 to 40%
Alumina	10 to 18%
Iron oxide	1.0 to 10%
Magnesium oxide	0 to 15%
Manganese oxide	1 to 5%

The cupola handbook refers to an average slag of 37 per cent bases, 44 per cent silica, and 19 per cent iron oxide and alumina.

Consideration is being given to the use of basic slags and their effect on cupola iron and cupola operation. It is beyond the scope of this discussion to investigate the complexities of slag formation and the chemical and thermomineralogical considerations involved in their attack on refractories.

It will be apparent, however, from the above considerations that for conventional cupola practice an acid refractory is indicated, with the possibility of basic refractories being employed where highly basic slags are being considered and used. Basic refractories have been used and may find more extensive application, but for this discussion of cupola refractories as applied to conventional cupola practice, it is apparent that our discussion should be based on a consideration of acid refractories.

Having observed that the chemical and slag considerations are best satisfied by the use of an acid lining, further consideration must be given to the thermal and physical requirements of the refractoy. Silica linings meet chemical requirements, but for reasons of physical characteristics and the practical consideration of installation, silica does not find extensive application in initial melting zone linings. For this applicaton the conventional practice is to use fire clay refractory shapes. Silica, particularly in the form of natural stone, does find application in making melting zone repairs.

The initial lining of the melting zone is usually made with fire clay refractory shapes, either cupola blocks, calliau blocks, circle brick, or 9-in. series. Natural silica stone and silica refractories on occasion are used in the melting zone. Likewise, some operators will install the initial lining monolithically.

The conventional practice, however, is to use fire clay refractory shapes. Before discussing the quality of the refractories used and their application, it is advisable to refresh our knowledge on the (*Please turn to page* 242)

Physical Properties of Commonly Used Fire Clay Refractories

	Intermediate Heat Duty	High Heat Duty	Super Duty	Special Burn Super Duty
P. C. E.	29-31	32-33	33-34	33-34
Temperature Equivalent	2985-3055 F	3090-3175 F	3175-3200 F	3175-3200 F
Reheat	(2460 F) 1.0C-2.0E	(2550 F) 1.0C-2.0E	(2910 F) 1.0C-1.5E	(2910 F) 1.0C-1.0E
Hot Load % Deformation	(2460 F) 2-6	(2460 F) 2-5	(2640 F) 3-8	(2640 F) 1-4
Panel Spalling	Test not suited	(2910 F) 4-20	(3000 F) 0-4	(3000 F) 0-5
Apparent Porosity	10-20%	10-20%	12-18%	9-14%
Modulus of Rupture	600-2000 psi	600-2000 psi.	400-800 psi	1000-1600 psi
Cold Crushing Strength	1600-5000 psi	1600-5000 psi	1000-2000 psi	2000-4000 psi
CHEMICAL ANALYSIS				
Silica	59.0-64.0%	54.0-59.5%	51.5-54.5%	51.5-54.5%
Alumina	30.0-35.0%	35.0-40.0%	41.5-45.0%	41.5-45.0%
Iron	1.0-4.5%	1.0-3.5%	1.0-2.0%	1.0-2.0%
Lime	0.2-1.2%	0.2-1.0%	0.2-0.8%	0.2-0.8%
Magnesia	0.0-0.5%	0.0-0.5%	0.0-0.5%	0.0-0.5%
Titania	0.8-1.8%	1.0-2.0%	1.2-2.2%	1.2-2.2%
Alkalies	0.5-2.5%	0.5-2.0%	0.5-1.0%	0.5-1.0%

Pressure Casting

WHILE use of compositions of plaster of paris or gypsum cement as a molding medium into which nonferrous alloys are cast is an old art, it was not practiced extensively until just before World War II, and was brought to a high state of perfection during the war for commercial production of castings. One branch of plaster molding or casting in which great curiosity and interest developed was that of pressure-casting matchplate patterns, particularly since many were under the impression that it was a panacea for the numerous ills encountered in use of other methods of production.

However, that is far from the truth as considerable skill and experience are required for quality work, and as much if not more care must be taken in preparation of molds made of gypsum as with other mold materials. Since various features in the procedure employed for making matchplates in gypsum, and of casting them with and without additional pressure are interesting, some of those as practiced at Ebaloy Inc., Rockford, Ill., will be described particularly with regard to the average plate containing a number of patterns. It sould be pointed out that large patterns similar to those shown in Figs. 2 and 3 can also be produced. The greatest savings are made in the use of the pressure cast matchplate system by the elimination of the gated hand pattern. The gated pattern is eliminated by making the required number of individual piece-molds and assembling them properly to produce the desired matchplates.

First step in the making of a matchplate is the produc-

Fig. 1—Pattern and its follow board are surrounded by a flask, and liquid gypsum cement is poured over it. Interface between pattern and cement is tamped with a stiff brush to remove any air bubbles

Fig. 2—Use of the pressure casting in gypsum cement molds is not limited to small patterns as may be seen from this illustration showing molds for furnace parts

Fig. 3—Piece molds are laid out or arranged on glass-topped table, a steel flask placed around them and cement poured in which combines them into a single mold

Fig. 4—Pouring a matchplate. Note pouring table and clamping of mold

By EDWIN BREMER
Metallurgical Editor
THE FOUNDRY

g Matchplates

tion of the piece-molds, which later are joined together, as will be described at the proper point. One of the prime requisites in this is an excellent knowledge of foundry or molding practice so that the parting line established on the master pattern is correct—and hence that operation should be performed by an individual with the necessary skill, experience and judgment. Next step is the preparation of some type of follow board, to produce the parting, and for the purpose of illustration it will be assumed that the pattern has an irregular parting line.

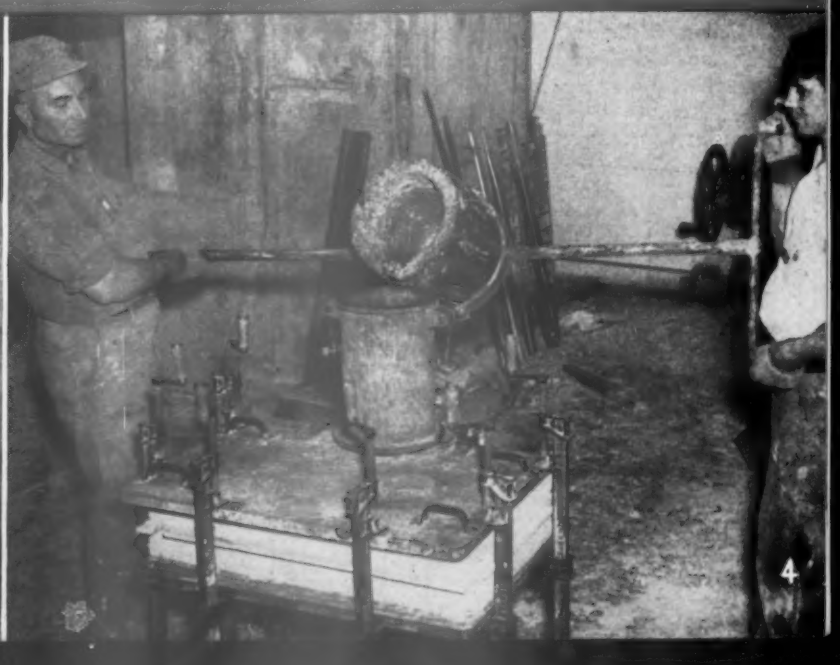
The follow board, as indicated in Fig. 6, may be a piece of wood or gypsum cement of sufficient area to permit development of a parting line from pattern to flask joint (assuming that regular flask equipment is to be employed) without too steep a slope or gradient. A cavity is made in the center of the follow board just sufficient to permit the pattern to rest at the lowest points of the parting line previously established. If the hole or cavity is made too deep a little modeling clay can be used to bring the line to the desired register. Since the parting line is irregular it is necessary to build up certain portions from the mold joint to pattern; this is accomplished preferably by the use of modeling clay, although gypsum may be used. The built-up portion should be given the proper slope or gradient as previously mentioned.

Small brass pins ⅛-in. diameter may be located in opposite corners of the piece molds to provide locating or registration points for future operations. Alternatively the pins may be of different sizes or shapes to prevent any possibility of mismatching in the later stages.

Pattern and follow board are now ready for casting the piece mold, and to eliminate any possibility of the gypsum sticking to them, they are coated with a parting compound of which a number of materials are suitable. They include stearic acid, petroleum jelly, lard oil, light lubricating oil, spirits of camphor alone or in combination, as well as commercial parting compounds. After the pattern and board are coated they are placed in a small flask which is composed of 1-in. boards as shown in **Fig. 1.** As may be observed, two of the boards are fastened together to form L-shape sections with one long leg and one short one. These are clamped together with the short legs at opposite ends to form a box or flask, and extenders can be placed between the short leg and its opposite long side to make the opening larger if desired. They are weighted down so that they will not float.

Gypsum cement or plaster composition then is poured slowly and carefully in the flask usually from one edge, as shown in Fig. 1, to hold to a minimum the formation of air bubbles over the surface of the pattern. To insure that bubbles are not present at the interface between gypsum cement and pattern, the liquid mixture is tamped gently with a bristle brush—reaching down to the interface. After a period of approximately 20-25 minutes the gypsum cement sets or becomes solid although still moist. Then the flask is unclamped and removed from the mold. The latter is separated carefully from the pattern and follow board by inserting a thin blade along the joints. Sometimes compressed air is used to facilitate separation by drilling a small hole through the pattern and injecting air through a small nozzle. The air may also be introduced by means of a hole through the mold which is later closed.

If the parting compound has been applied properly, there should be no difficulty encountered in separating the two pieces. It takes skill and patience to get the feel of this operation. All four sides of the piece mold are trimmed to size and scored deeply while the gypsum still is moist, to form a key for the cement poured around them after group assembly. If only enough piece-molds are needed to make one matchplate, the same procedure is followed until the required number of piece-molds are made. However, if a large number of piece-molds are desired for six or eight matchplates, one or more duplicates



of the master pattern and follow board can be made by filling one of the piece-molds with gypsum cement. These can be used by other operators to make piece-molds, and thus reduce the time of delivery of the plates.

The piece-molds just described, when assembled will comprise what will be termed the cope, and the next step is forming piece-molds for the drag. Procedure is to remove the pattern from the follow board, set it firmly in one of the cope piece-molds, and place brass pins in the locating or registration points mentioned previously. With that combination as the master, the required number of piece-molds for the drag are made, following the various steps as outlined previously. Likewise where a large number of drag piece-molds are desired, a duplicate master can be produced as in the case of making the cope piece-molds.

After the piece-molds have been completed they are ready for assembly. Those for the cope are assembled first by laying them out on a flat plate glass-topped table as shown in Fig. 3, with the openings of the cavities facing down. A template the size of the contemplated matchplate is placed around them so that the operator can arrange the piece-molds in the best possible manner for sound gating practice. A flask somewhat larger than the template dimensions and a couple of inches deeper than the height of the piece-molds is centered over the template. The flask may be similar in construction to those used for making piece-molds, or made especially for the job in hand. The template is removed and liquid plaster composition poured into the flask, filling it to the top; thus making a composite mold of the individual piece-molds. After the plaster has set up, but while still in a plastic condition, it is struck off level with the top of the flask with a steel straight edge.

Fig. 5—Cope and drag matchplate patterns for furnace castings made in gypsum cement molds and cast under pressure

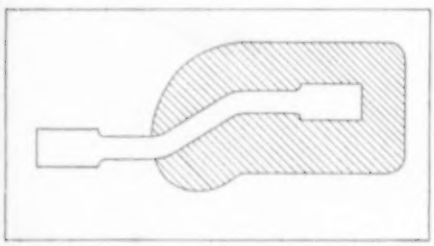
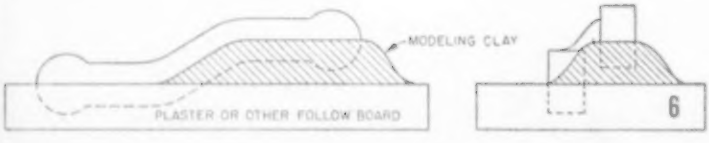


Fig. 6—Sketch showing the arrangement of a pattern in a follow board using modeling clay to build up the parting joint



It should be pointed out that general practice is to pour the matchplates from one side (usually the longest) with multiple gates leading from a runner with the sprue at the center. Hence, the flask is of such dimensions and placed in such a manner as to permit inclusion of the gating system. In some cases where metal flask equipment is employed, one side piece is formed with a sufficient bulge or projection at the center to take care of the sprue section and the reservoir, to be described later. With such an arrangement less plaster is used than if the side were straight.

When the plaster has hardened sufficiently, or "set" as it is termed, the cope mold, still in the flask, is rolled over so that the cavity-containing side is uppermost. The proper brass pins are placed in the various locating or registration points, and the mold is given a coating of the parting compound. Then the drag piece-molds are located on top of their respective cope piece-molds by means of the brass pins. A flask is set down over the assembly and liquid gypsum cement composition is poured in. After the cement composition has hardened or set, the two molds are separated and pins removed. The small locating or registration holes left by the pins are filled with the composition and the gating system for the patterns and for the matchplate are tooled out. These operations are performed at this time since the gypsum still is soft and can be worked easily. Then the complete molds and flasks are placed in the oven to dry.

Mold Drying Time Varies

The time required for drying a mold varies with the mass and type of drying oven. Usually 18 to 20 hours are required to properly dry or calcine the mold. A dry mold does not mean one dry to the touch because air-dried gypsum plaster contains approximately 21 per cent chemically combined water which must be driven off before metal can be cast in the mold. A recirculating type oven, properly baffled so that no direct currents of air impinge upon the mold which would cause excessive local shrinkage, is preferred for mold drying.

The chemical composition of "set-up" gypsum plaster, air dried, is $CaSO_4 \cdot 2H_2O$. A mold used for metal casting must be converted to $CaSO_4$ or the metal will not rest on the surface of the mold. This conversion of $CaSO_4 \cdot 2H_2O$ to $CaSO_4$ is accomplished by subjecting the set-up plaster to temperatures of 400 F or over for a period of time long enough to drive off all chemically combined water. This point can best be determined by imbedding a chromel-alumel thermocouple in the thickest part of the mold during the burn-out. When this thermocouple registers a temperature above 300 F allow to soak for about one-half hour. Then the mold burn-out is complete. The mold temperature will not go above 212 F as long as free water remains in the plaster. The oven temperature must be lowered gradually to a maximum of 150 F before the mold is re- (*Please turn to page* 284)

STEEL FOUNDERS' SOCIETY

Holds 45th Annual Meeting

FORTY-FIFTH annual meeting of the Steel Founders' Society of America was held at the Edgewater Beach Hotel, Chicago, Feb. 12-13. The first session was devoted entirely to reports of officers and committee chairmen, with E. D. Flinterman, president, Michigan Steel Castings Co., Detroit, and president of the society, presiding.

Raymond L. Collier, executive secretary of the society, in his annual report outlined several changes in society bylaws which are being made. He paid tribute to the fine work of the various committees of the organization, and spoke of the activities of the society during the last year in helping to relieve shortages of such items as pattern lumber, cereal binders, core oil and foundry nails. It was announced at this session that Mr. Collier was leaving the society on Feb. 28 to become executive vice president of the Gray Iron Founders' Society.

Keith Williams, president, Pratt & Lechworth Co., Buffalo, and treasurer of the society, presented the annual report of the treasurer which indicated that the organization was in a healthy financial condition.

Charles W. Briggs, technical and research director of the society, praised the work of the Technical and Operating and the Technical Research Committees and stated that eleven projects now are active in connection with the research work of the society. It is his belief that the following six reports will be ready for publication during the year: 1. Neck-down risers for production castings; 2. Homogenization and its effect on the mechanical properties; 3. Summary report on the effects of hydrogen and nitrogen in steel; 4. Pressure feeding of castings with pressures greater than atmospheric; 5. Riser efficiency—first of a series in which over 60 steel foundries are participating; 6. Study of washes for molds and cores. As these projects are completed, it is planned to initiate about the same number, with proper care being taken to maintain a balance in the types of work being done.

Advertising Plans Are Outlined

E. S. Weidle, Pittsburgh Steel Foundries Corp., Glassport, Pa., and chairman of the Advertising Committee, outlined the plans for production and institutional advertising in connection with trade publications and direct mail. A. M. Andorn, Penn Steel Castings Co., Chester, Pa., chairman of the Definitions and Classifications Committee, outlined the extensive work which was undertaken by his group following the decontrol of prices and the restoration of open price reporting. J. A. Sauer, Symington-Gould Corp., Rochester, N. Y. and chairman of the Education Committee, reported on the establishment of a foundry course at Massachusetts Institute of Technology by the Steel Founders' Society.

George T. Johnson, Buckeye Steel Castings Co., Columbus, O., and chairman of the Research Fund Committee, discussed some of the projects now being studied by the research division of the society and gave details of certain new projects being considered. He praised the work of the Technical Research Committee on the accomplishments of the past year. L. S. Adam, Continental Foundry & Machine Co., East Chicago, Ind., and chairman of the Safety Committee, reported that his group has been studying safety records of foundries with the idea of improving safety in the industry. He also reported on a safety contest which is to be conducted during June, July and August, 1947. The committee had charge of a safety session at the Technical and Operating Meeting held last year at Columbus, O. Donald C. Bakewell, Blaw-Knox Co., Pittsburgh, and chairman of the Sales Manual Committee, presented a complete copy of the manual to the meeting as the report of the committee. W. J. Bennett, Buckeye Steel Castings Co., Columbus, O., and chairman of the Statistical Reports Committee, outlined a study to simplify the collection of statistics by the society.

J. A. SAUER
Awarded Lorenz Medal

W. F. WRIGHT
Awarded T & O. Medal

W. F. Wright, Sawbrook Steel Castings Co., Cincinnati, and chairman of the Technical and Operating Committee, reported on the Technical and Operating Conference held at Columbus and indicated plans for future meetings. C. L. Heater, American Steel Foundries, Chicago, and chairman of the Technical Research Committee, indicated that the research activities of (*Please turn to page* 254)

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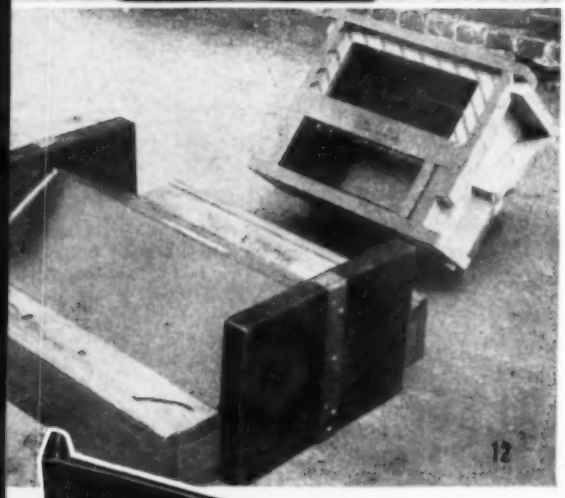
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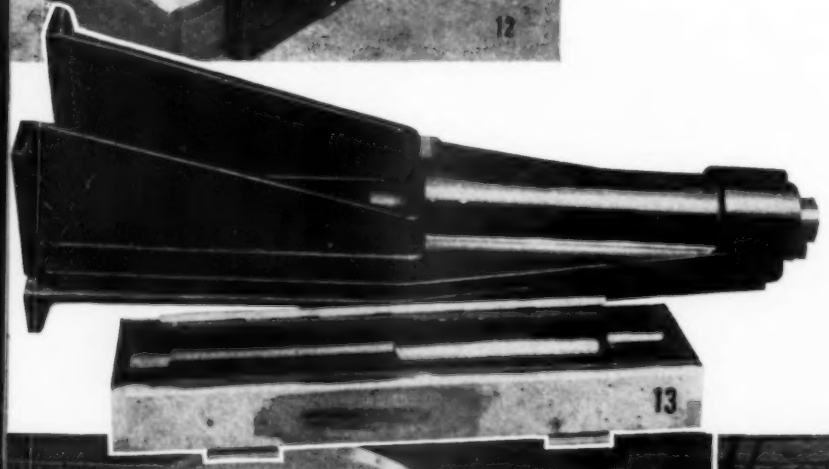
This second of three articles discussing pattern requirements describes the type of equipment recommended for use in production of medium and large size castings. It is taken from a special report prepared for the Steel Founders' Society of America

WHAT KIND OF *Patterns*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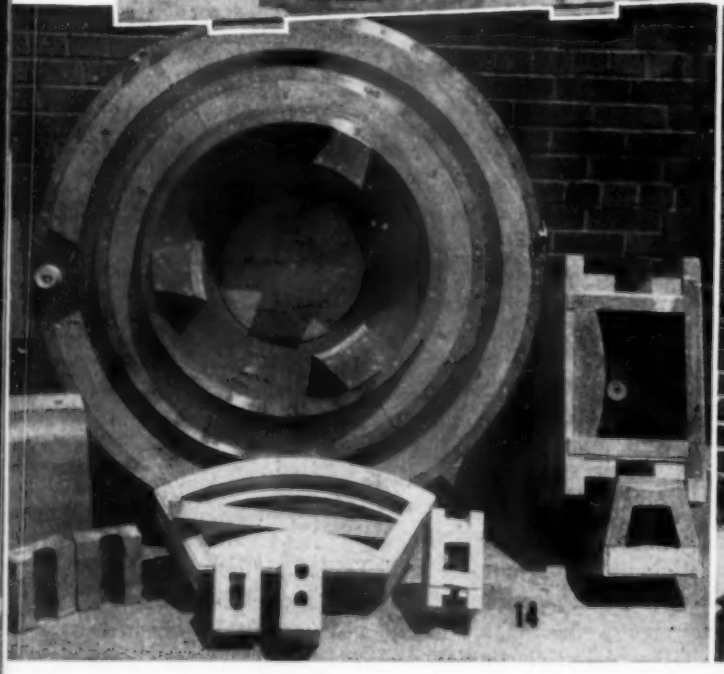
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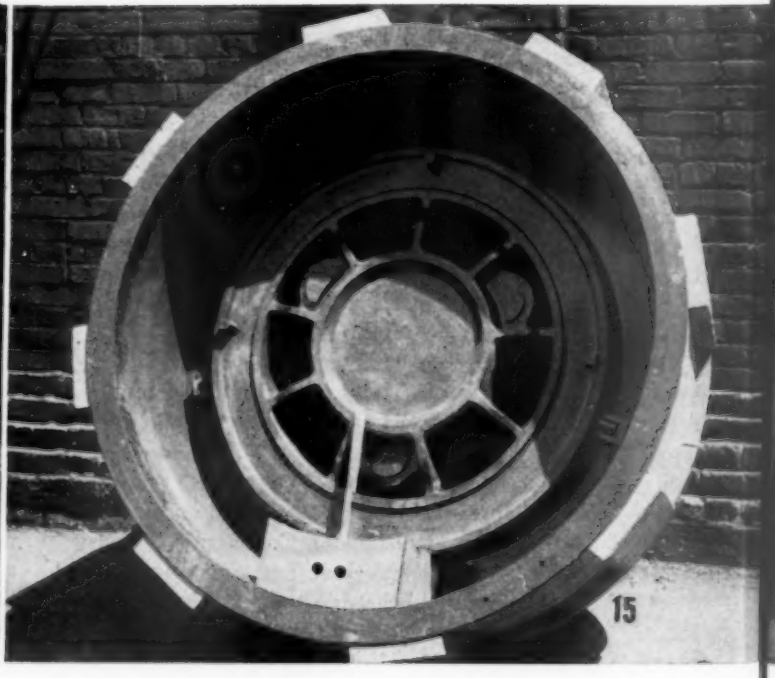
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IN THE production of medium size castings— measuring up to 72 in. for the largest dimension—patterns and coreboxes may be made of soft wood when less than 50 castings are required. In respect to material and type of equipment the pattern requirements for runs of this size are little different than those for the production of small castings, as described in the March issue.

For the production of 50 to 249 medium size castings hardwood patterns with wearing surfaces metal faced are recommended. Coreboxes likewise should be metal faced. If 250 or more castings are to be made, the preferred material is combination hardwood and metal or all metal, for both pattern and coreboxes.

Producing less than ten castings calls for one loose pattern split for ease of molding if design permits. Draw straps or lifting and rapping plates should be provided. An example of this type of pattern is shown in Fig. 11. When the number of castings required ranges between 10 and 49 the preferred type of equipment consists of one matched pattern, or a split (Fig. 13) or flat back (Fig. 12) pattern suitable for: 1. Follow board, in which case suitable draw straps or matching plates and rapping plates must be provided. 2. Quick matching on cope and drag boards in accordance with the operating department's practice and specifications.

Figs. 14 and 15 show medium size pattern equipment (approximately 4-ft diameter), made of soft and hardwood and metal faced, and suitable for repeat small orders of one to nine castings. This flat back equipment can be mounted on cope and drag boards for quantities up to 249. Pattern and miscellaneous coreboxes are shown in Fig. 14, the main cover corebox in Fig. 15.

Another example of a medium size pattern constructed of soft wood, matched on cope and drag boards and suitable for 10 to 49 castings, is illustrated in Figs. 16 and 17, the former being the drag and the latter the cope. Patterns of this type, if hardwood faced, should be good for an additional 150 castings. Coreboxes then should be metal faced.

Equipment for production of 250 or more castings calls for one or more patterns mounted on cope and drag boards in accordance with the operating department's practice and specifications. Equipment may require gang coreboxes; if coreblowing facilities are available, coreboxes must be constructed suitable for blowing in keeping with the operating department's practice and specifications.

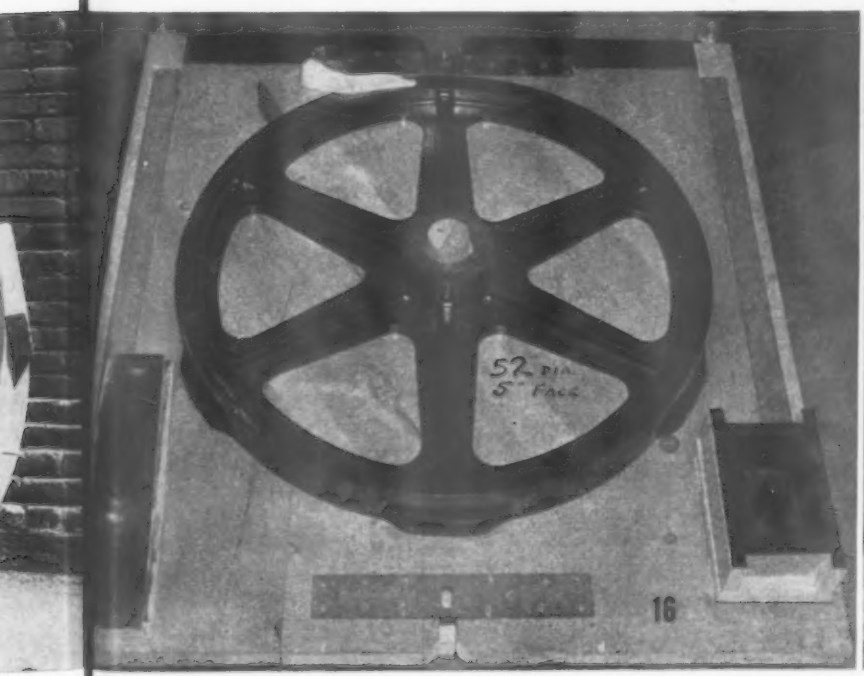
Fig. 11—Medium size pattern, made of soft wood, suitable for one to nine castings. This type equipment must be floor molded

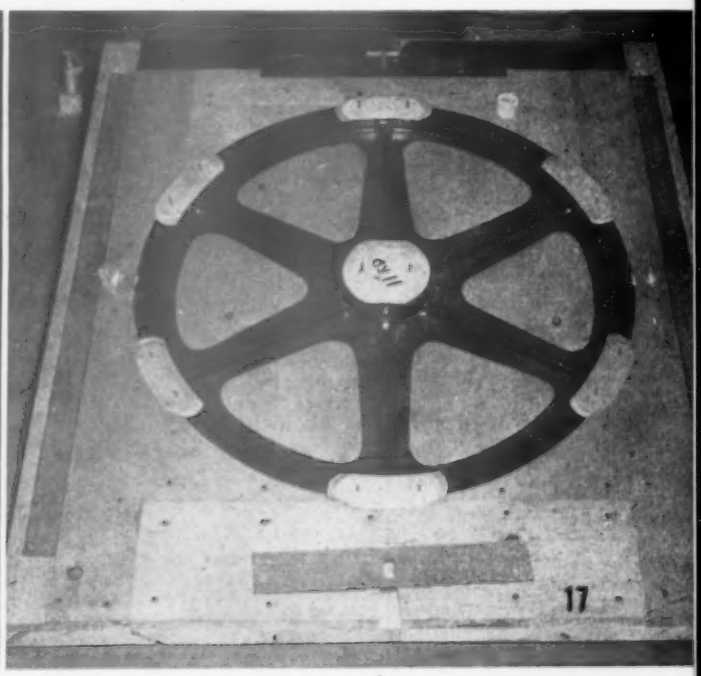
Fig. 12—Medium size pattern of the flatback type, made of soft wood. It is suitable for floor molding one to nine castings or can be quickly matched for larger quantities.

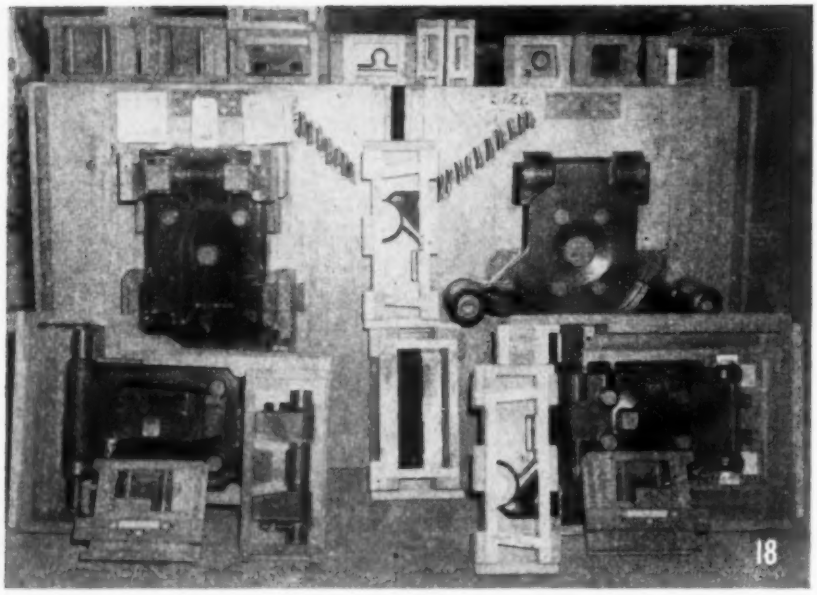
Fig. 13—Medium size split pattern, made of soft wood, suitable for floor molding one to nine castings. Can be quickly matched for larger quantities

Figs. 14 and 15—Medium size equipment made of soft and hard wood and metal faced, suitable for repeat small orders of one to nine castings. Pattern and miscellaneous coreboxes shown at left, main cover corebox at right. This flat back equipment can be mounted on cope and drag boards for quantities up to 249

Figs. 16 and 17—Medium size pattern made of soft wood, matched on cope and drag boards suitable for 10 to 49 castings. Cope shown at right, drag at left. If hardwood faced, such patterns should be good for an additional 150 castings. Coreboxes then should be metal faced







The pattern shown in Fig. 19 is constructed entirely of aluminum, mounted on cope and drag boards made of wood and steel faced. Some foundries may prefer steel plate mounting. Coreboxes are of aluminum and made suitable for coreblowing. Core driers are furnished as part of the pattern equipment. This equipment is suitable for quantities of 500 or more castings.

Additional requirements are involved in patterns for large castings—over 6 ft in the largest dimension. For one to nine castings pattern and coreboxes may be soft wood, but these large patterns must be well braced internally regardless of number of castings to be made, to avoid distortion during ramming and drawing from the mold. They should also be furnished with appropriate drawstraps. Patterns and coreboxes for making 10 to 24 castings also may be made of soft wood. Such patterns may be split or flat back type suitable for matching on cope and drag boards, or to be used with follow boards.

When 25 to 100 castings are required the large soft wood patterns should have exposed projections metal faced and corebox es of soft wood also should be metal faced. Patterns for 25 to 100 castings may be loose or mounted on cope and drag boards, all in accordance with the operating department's practice and specifications. Coreboxes must be exceptionally well constructed, using screws where possible, and the large size boxes must be bolted together at the ends.

Large patterns used to make 100 or more castings should be hard wood, metal reinforced, with hard wood coreboxes metal faced. Patterns should be mounted on cope and drag boards or plates whenever possible and exceptionally well braced internally. If patterns are to produce well over 100 castings and are to be molded under a sandslinger, it may be well to brass-face the entire pattern.

To avoid the necessity of rolling drag mold over to mold cope, skeleton patterns of the type shown in Fig. 22 are sometimes required. The numerous rectangular holes through the pattern are swept out to metal thickness. The two large coreprints running lengthwise strengthen the pattern and eliminate a deep cope offset. Corebox to the lower right forms cover cores, making a cope mold unnecessary. Appropriate draw straps must be furnished.

The patterns shown in Figs. 20 and 21 likewise are suitable for one to nine castings. The wheel pattern (Fig. 20) is 9 ft in diameter and must be fitted with effective draw straps. The large split pattern shown in Fig. 21 is suitable for floor molding, or can be quickly matched for approximately 24 castings or for small repeat orders.

(To be concluded next month)

Fig. 18—Medium size pattern equipment mounted on cope and drag boards. It is made entirely of hard wood, with coreboxes and wearing surfaces of pattern metal faced. This type equipment suitable for repeat orders for 50 to 249 castings

Fig. 23—Large pattern showing soundness of construction and numerous draw straps of sufficient strength to enable molders to draw pattern without distortion or breakage. This pattern is made of soft wood throughout and is well braced internally

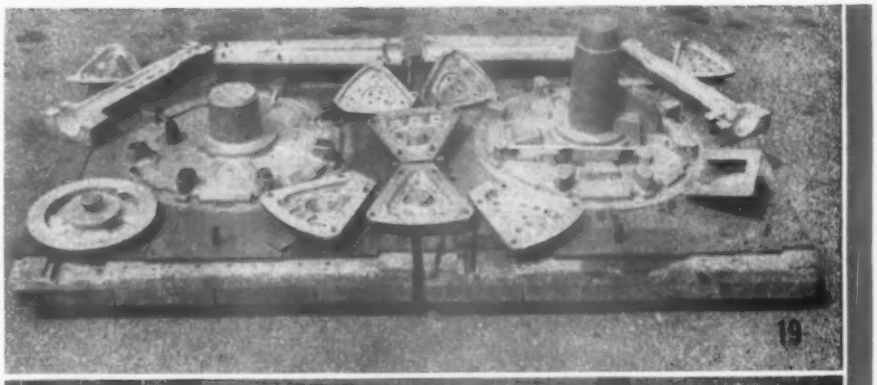
Fig. 24—Complete corebox equipment for pattern shown in Fig. 23. Note soundness of corebox construction—all boxes are well braced and battened and made of soft wood lumber 1½ to 2 in. thick. Pattern equipment of the type shown here and in Fig. 23 is suitable for production of at least 24 castings

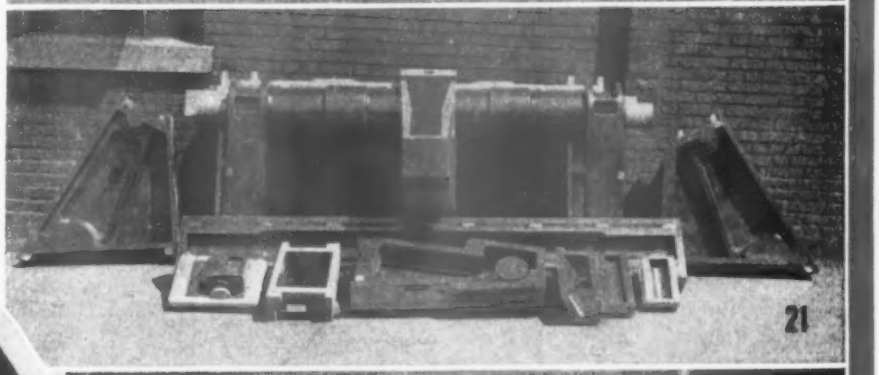
Fig. 19—Medium size pattern constructed entirely of aluminum, mounted on cope and drag boards made of wood and steel faced. Coreboxes are aluminum and suitable for core blowing. For 500 or more castings

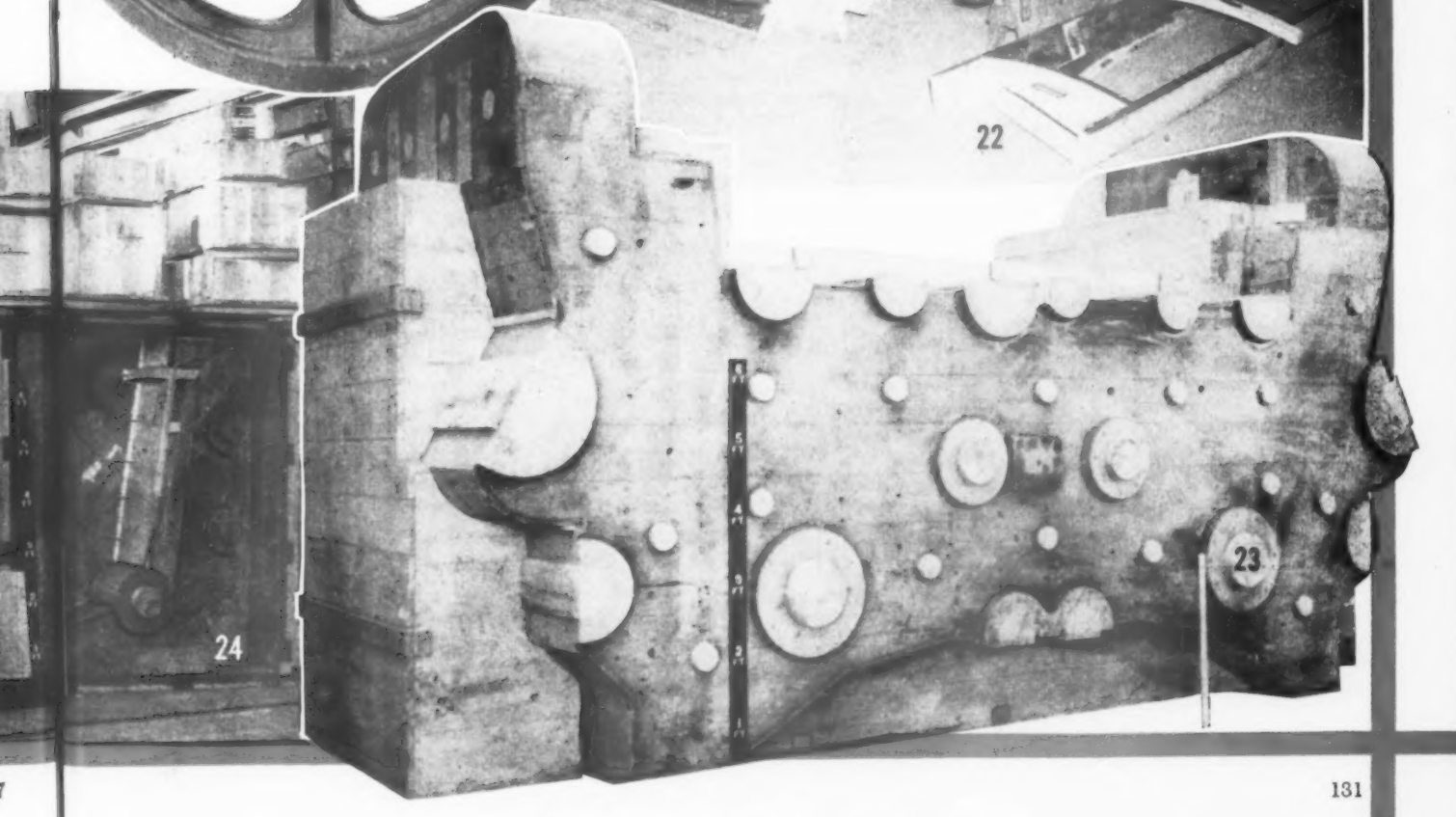
Fig. 20—Pattern 9 ft in diameter made entirely of soft wood and suitable for one to nine castings

Fig. 21—Large split pattern made entirely of soft wood, suitable for floor molding one to nine castings, or can be quickly matched for approximately 24 castings or for small repeat orders

Fig. 22—Large skeleton pattern, 5 x 12 x 24 ft. Soft wood, suitable for molding one to nine castings







Drosses and Oxides Are Shown

Q.—We are sending for your inspection three aluminum alloy sole plates for electric irons with which we are having considerable trouble in that the working or polished surface shows numerous small pits and other blemishes. Can you suggest any remedies?

A.—The aluminum sole plates submitted for examination were fractured and the surfaces inspected under a low-power magnifying glass. This study indicated to us that the metal contained considerable dross or oxide, and exhibited a gassy condition. Procedures to eliminate trouble from those sources are to take more care in melting and handling the molten metal. Temperature in the furnace should not be more than 100 F above the desired pouring temperature, and the aluminum should not be allowed to remain in the furnace for any length of time waiting for molds. The longer it remains at comparatively high temperature the more gas it will absorb.

Previous to removal from the furnace the metal should be degassed and cleaned by use of a gaseous or solid reagent following the maker's directions on usage. Possibly the oxides and drosses may be incorporated into the metal by your method of stirring before skimming. Best method is to use a hook-shaped stirring rod and employ a pumping action from the bottom up to give a rolling action which does not disturb (break) the surface skin to any degree. Breaking of the skin exposes clean metal to oxidation as well as tending to fold in the oxide skin. Skim only after the stirring is completed.

Questions and Answers

Core Removed with Difficulty

Q.—The cores for aluminum castings made in weights from 2 to 7 lb are vented through a neck ⅜ to ½-in. diameter. In the cleaning room all the core sand must be removed through this small opening. The smaller size core is made in halves, dried, then capped green and put back in the oven. The larger cores are made and dried in halves which then are pasted and put back in the oven long enough to dry the paste. The mixture from which these cores are made contains about 5 wheelbarrows of sand, about 9 quarts pitch base dry binder and about 6 quarts liquid binder. Cores are satisfactory in every respect, except one. They are difficult to remove from the casting. The castings must be cleaned by hand by pounding them with a mallet, pulling out the wires and letting the sand run out through the small opening. Pounding with a mallet causes the present cores to break up into lumps too large to pass through the opening. We shall appreciate your recommendation for a good core mixture, and a paste which will not soak into the cores quite so much.

A.—From the figures submitted we should say that the amount of binder in the core sand mixture is too high. Average capacity of a foundry wheelbarrow is 4 cu ft, or 440 lb. Five barrow loads means 2200 lb sand. Bond material amounts to 3¾ gal, or 54.37 lb. This is a ratio of approximately 1 to 40 and is not too high if everything was weighed and measured with scrupulous accuracy. Any person familiar with foundry conditions knows that a general order of *about* 5 barrowloads readily may be freely translated by the barrow man. It is much easier to wheel a barrow lightly loaded than it is to push a barrow with a full load of 440 lb.

The possible excess of binder is accentuated by the addition of a heavy layer of paste between the half cores. Under the conditions outlined we should expect to find blowholes in the castings. Apparently this is where our theory falls down, since you report that the vent comes off freely and the castings are satisfactory. That is the main objection to long distance, sight unseen diagnosing. As a plain matter of fact cores can be made from a wide variety of mixtures. In the present instance the mixture and method of making the cores will serve if the amounts of binder and paste are reduced. The best method of making these cores would be to either blow them or book them. This would eliminate the use of paste, but would involve the use of metal dryer shells to support the one-part cores while in the green state. Lacking equipment of that kind and continuing your present method, you can secure relief by scooping out the inside of each green sand half core and filling the cavity with either clean sharp sand, or old burned molding sand.

Brass Matchplate Face Scabs

Q.—Two brass housing match plates 14 x 22 in., one for drag, are rough and scabby with sand burned in all over the surface. Weight of the cope is 125 lb and that of the drag plate is 175 lb. Molds were faced with Albany No. 1 sand while the remainder of the flask was filled from our regular Windsor Locks heap sand. Metal from a single crucible entered the mold through six gates at one side. The metal was at a fair pouring temperature. Plumbago was brushed over the face of the mold which then was dried to some extent.

A.—From the fact that your heap sand is Windsor Locks we assume that your regular line of castings is small and light. These comparatively heavy match plates present certain features which are not present on small castings. You may have overlooked some factors in your description, but in a general way we are inclined to the opinion that the mold has not been vented properly. The sand combination is the opposite to what it should be with the backing sand tighter and therefore more impermeable than the sand next the casting. The backing sand, where two grades of sand are employed, should be the more open and permeable of the two.

Preferably you should use all Albany sand in the mold, but if conditions force you to confine the use to a facing layer, the mold should be closely vented with a wire. The scabs and general roughness are caused by steam which cannot escape rapidly enough in a direction away from the casting. The steam lifts patches here and there on the face of the mold and results in the unsightly patches on the face of the casting.

Assuming that the metal thickness is not more than ½-in., no trouble should be experienced in producing a clean casting in a properly made green sand mold. Spraying or painting the face of the mold with mixture of molasses water and plumbago and then drying the face is a precautionary measure, and if performed properly, insures a clean face on the casting. However, where the drying is not sufficient, the result is worse than if no drying had been attempted. Moisture which is not driven off by the heat, remains in pockets and other depressed portions of the mold and creates an extra volume of steam in contact with the molten metal. Briefly, we suggest venting the mold adequately and skin drying the face thoroughly.

Castings Containing Tellurium

Q.—From time to time we have made hard iron castings which successfully met one of our customer's requirements by using tellurium additions in the ladle. However, we have accumulated considerable scrap in the form of gates and risers which we would like to use up as a part of a gray iron charge. We have been told that tellurium is a foreign element in gray iron, and will cause a bad heat. We have silicon briquets available to increase silicon content if that will counteract the effect of tellurium.

A.—Since tellurium boils at 1390 C or 2534 F, we do not believe that you should be unduly alarmed about the possible effect of tellurium bearing scrap remelted in the cupola. In fact, on occasion tellurium additions to extremely hot iron, or waiting for too long a period before pouring, have produced iron which did not show the usual characteristics of such addition.

One way to prove the point that the tellurium volatilizes during remelting would be to put a coke split on top of the final charge entering the cupola, and use several hundred pounds of the gates and risers as the iron charge. The resulting iron can be pigged and broken for examination of the structure, or better yet some of it could be poured into slabs or sections of various thicknesses, and those fractured for examination. From that you can determine how the scrap can be handled best. In case of hard edges or corners due to residual effects of the tellurium, relief might be obtained by additions of graphite or other graphitizing compounds in the ladle.

Removal of Gases From Bronze

Q.—We operate a bronze foundry in France and find articles in THE FOUNDRY of considerable interest. Recently we read the article "Pressure-tight Phosphor Bronze Castings" by Lambert and dePierre in the November issue and would like some further explanation of the following: 1—What kind of copper oxide is used in the oxidizing flux? 2—In describing the operation the authors say to melt the copper and add 1 lb potassium nitrate per 100 lb melt, and we assume that the latter refers to the flux. 3—When a heat includes 50 per cent virgin metals and 50 per cent ingot or scrap (the scrap consisting exclusively of runners, gates, etc. of the same alloy namely, 83.7 per cent Cu, 8 per cent Sn, 8 per cent Pb, 0.3 per cent P—no zinc—having been made by the oxidation-reduction method) do we have to add flux when melting the virgin metals?

A.—While not specifically indicated in the article in question, the copper oxide employed in the flux is the higher or cupric form, CuO, according to the original investigation by Baker and Child mentioned by the authors. That material decomposes to the lower or cuprous form, Cu_2O, on the application of heat which frees some oxygen for the oxidation reaction. Similarly only part of the oxygen in the potassium nitrate, KNO_3, is available. Your assumption that the description of the procedure refers to the CuO-KNO_3 flux mixture rather than to just KNO_3 is correct, although Baker and Child indicate that KNO_3 alone appears to be effective.

Your last question on use of virgin metals and scrap or ingot may be answered by pointing out that Baker and Child found out that the presence of powerful deoxidants such as P, Al, Mg, Si and Mn is likely to hinder the removal of H. Practically all of the P must be removed for effective degasification, and that was indicated by Lambert and dePierre on page 134 of the November issue where they mentioned that the use of the flux with scrap and ingots of phosphor bronze gave poor results. Baker and Child state that copper-tin alloys containing up to 0.05 per cent P can be conveniently degassed by deoxidation provided the P is eliminated in the oxidation. It is impractical and wasteful to eliminate large amounts of P by oxidation, and the alloys should be degassed by a scavenging treatment such as use of dry N bubbled rapidly through the melt at the rate of 500-600 liters/hr for 5 minutes. Presence of Zn has the same effect as P but to a lesser degree. Alloys containing up to 0.5 per cent Zn can be degassed rapidly by the oxidation-reduction treatment while alloys containing amounts normally found in commercial alloys (2-5 per cent) cannot be degassed by such treatment. Such alloys can be rapidly degassed by scavenging treatment with dry nitrogen, but zinc fume and zinc loss make the process unattractive. Manganese ore (2 per cent by weight) charged in the bottom of the

GANGWAY!

By J. A. PATTERSON

Come on, Bowser! Those are just diesel engine cylinder cores.

crucible is fairly effective in reducing the gas content of gun metals.

Hence, it appears that if you desire to recover as much P as possible from the scrap and ingot, it will be necessary to use the flux procedure with the virgin metals followed by the addition of the scrap or ingot. Otherwise, the scavenging treatment should be employed.

Melt Scrap Charges in Cupola

Q.—Since present conditions force us to use all scrap charges in our 21-in. diam cupola we shall appreciate your opinion on several features of operation. 1—Can we make satisfactory castings by incorporating carbon briquets, ferrosilicon, ferromanganese, and oyster shells in the scrap charge? 2—Is the ferrosilicon charged through the door, or at the spout? 3—Is ferromanganese charged in lump or powdered form? 4—Are oyster shells equal to limestone as a fluxing agent?

A.—Many foundries, particularly in remote districts never melt any pig iron. Scrap makes satisfactory castings, either in the natural state, or with the addition of alloys required to bring the analysis up to specification. Each time iron is melted it loses a definite amount of certain elements. Thus the carbon, silicon and manganese decrease while the sulphur increases. For this reason particular attention must be paid to the return scrap after each heat. 2—Lump ferrosilicon may be charged through the charging door. The finer material is added to the stream flowing from the cupola spout. However, a considerable loss of silicon is to be expected when added in the charge, unless briquets are employed.

It may not be out of place to mention that ferrosilicon is supplied in several grades. This factor must be taken into account when calculating the amount necessary to raise the silicon content to the desired point in the castings. 3—Same as No. 2. 4—Oyster shells, probably the best form of limestone flux, make a satisfactory fluxing agent. They are thin, pure and melt easily. For sanitary reasons, their use is objectionable in summer unless they have been exposed to the weather long enough to lose their organic accompaniment. Where they are charged directly into the fire, oyster shells will send off spalls of their hard-interior face with a crackling noise. The fragments fly upward and the finer material is blown out through the top of the stack. However, when charged on cold stock, none of the foregoing trouble is experienced.

Not So Easy To Make Castings

Q.—After working with steel and iron products for a year, we find it necessary to make products which will not require those materials, and have developed a product of aluminum which requires castings of the same metal. However, we find that every foundry in this area is so busy that they cannot take care of our needs. One of the largest foundries suggested that we make our own castings, and stated that it would not be difficult. Castings are small, and of even thickness, weighing 12 oz. We have a matchboard, coreboxes and patterns. Matchboard is 16 x 16 in. and set up to pour four castings at a time. We will require 144 castings a day. Can you suggest supplies and equipment?

A.—As you are well aware, it is comparatively simple to give advice, but a different matter entirely to put it into practical execution. Without any practical foundry experiences we believe that you will have considerable difficulty in obtaining satisfactory castings until you have gained an insight into the whys and wherefores of casting production. With the small amount of castings required we believe that it will be more economical to purchase your castings from a distant source than to try to make them. You mention that you have coreboxes so presumably the castings require cores, and hence at least two men will be required to make molds and cores. If the cores are not too difficult to make, the coremaker could help on molds, furnace tending and pouring. In any event a second man would be needed at various times to help in pouring.

Even without knowing what the castings are, we doubt seriously that one man could make the molds and cores by hand, shake the molds out, watch the furnace, etc. Possibly with a molding machine a skilled molder might be able to accomplish the desired production, but he would have to be on the job every minute.

For production of the castings an oil or gas-fired crucible-type furnace to hold a No. 60 or 80 crucible will be needed for melting the metal. A supply of a reasonably fine molding sand similar to Albany O is desirable to provide a smooth surface on the castings, and some clay-free sand similar to lake sand is required for coremaking. Perhaps the foundry which gave you the advice can suggest suitable sands for both purposes as well as the type of binder used in core work.

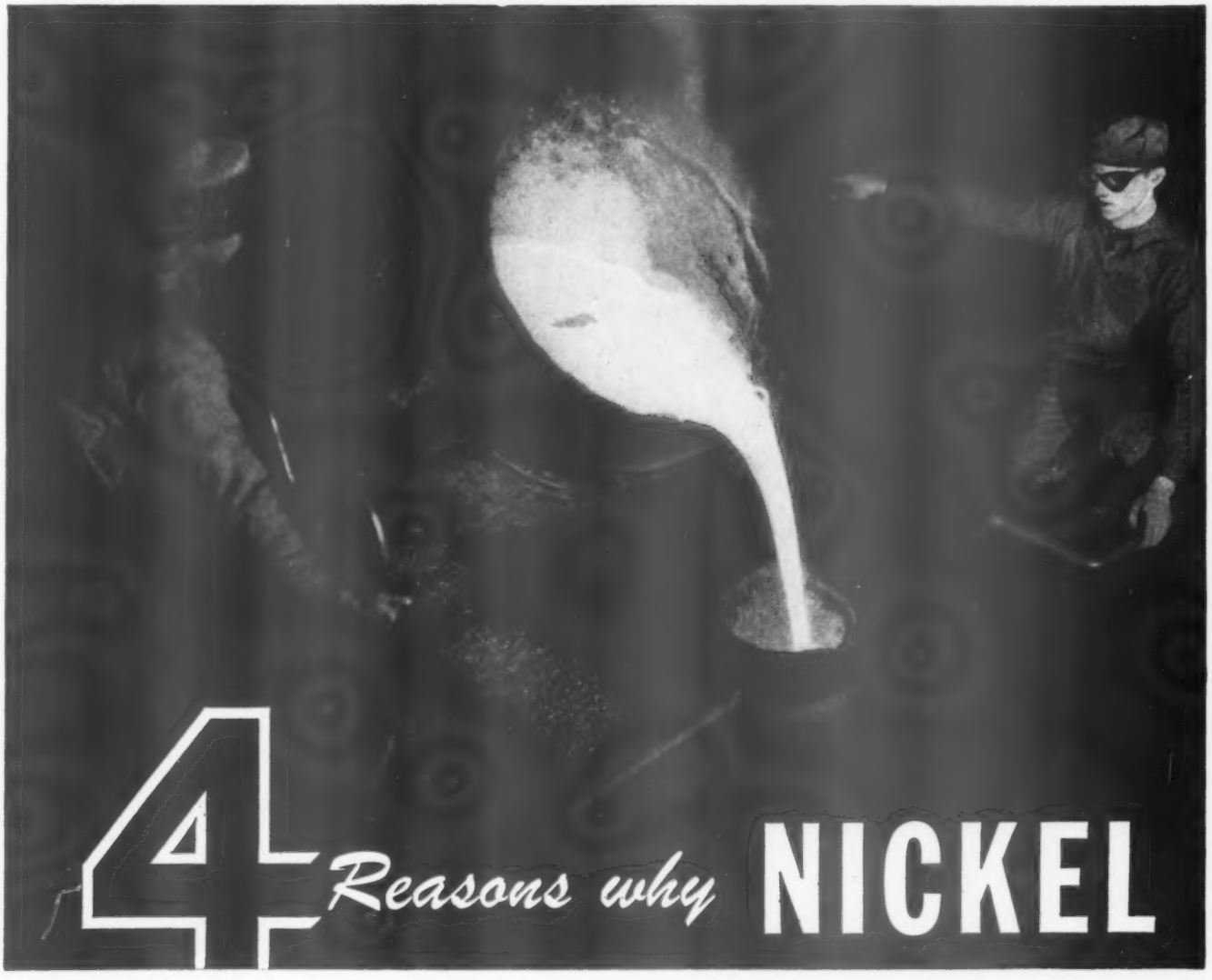
Presumably the molds can be produced with a set of snap flasks, and with those you will need a number of slip jackets. Usual procedure in small nonferrous foundries is to put up a number of molds while the metal is melting, and when that is accomplished, the molds are poured off. Then the castings are shaken out, the sand tempered and placed in condition for re-use. The cycle is repeated throughout the day. That method requires less sand and slip jackets and less melting capacity than if all the molds were made at one time and poured off.

Aluminum Cast Under Pressure

Q.—In the near future we expect to start the manufacture of pressure-cast aluminum matchplates, and we will appreciate literature on the proper mixture of molding plaster and talc, best type of drying ovens, etc.

A.—Up to the present comparatively little has been published on the subject of pressure-cast matchplates. One article "Pressure Casting Aluminum Matchplates" by J. P. Callahan appeared in the July, 1945, issue of THE FOUNDRY. The author points out that a suitable plaster composition is composed of 4 lb casting plaster and 1 lb fibrous talc which is mixed thoroughly in the dry state. That mixture then is added to the water in the proportion of 1 lb plaster mix to 1½ lb water, and stirred for 2 minutes or until a thick creamy mixture which will flow readily is obtained.

Preferable type of oven for mold drying appears to be a recirculating type baffled so that direct air currents do not impinge on the mold to cause excessive shrinkage. However, in many cases an oven similar to that used for drying sand cores is used. Baking temperature usually is between 350 and 400 F, and it takes from 18 to 20 hr to dry or calcine the mold properly. Mold must be cooled slowly in the oven to about 150 F before removal as it may be spoiled if removed while above that temperature.



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MEN of Industry

E. C. TROY, until recently chief metallurgist, Dodge Steel Co., Philadelphia, has been elected vice president in charge of research and development. Mr. Troy spent 2 years with Detroit Steel Casting Co., as assistant chemist, following graduation from high school, and then entered Michigan College of Mining and Technology where he received a degree in metallurgical engineering. He returned to Detroit Steel Casting Co. as assistant to the vice president and metallurgist. In 1937 he joined Dodge Steel as metallurgist, and became chief metallurgist in 1942. An authority on risering and sand control measures, Mr. Troy is at present serving as vice chairman of the Philadelphia Chapter of the American Foundrymen's Association. He also is an active member of the Steel Founders Society of America, American Society for Metals and American Institute of Mining and Metallurgical Engineers.

♦ ♦ ♦

Charles R. Ellicott Jr. has been appointed industrial sales representative, Symington-Gould Corp., Rochester, N. Y., to handle sales of carbon steel and alloy steel castings in New York, New Jersey and Pennsylvania, with headquarters in New York. Mr. Ellicott was sales engineer, Westinghouse Electric Corp., Pittsburgh, prior to Maritime Commission and Navy service during the recent war.

Emmett A. Williams has been appointed vice president in charge of operations and **I. E. Cox,** vice president in charge of engineering, National eBaring Division of the American Brake Shoe Co., New York. Mr. Williams attended Pennsylvania State College and joined the company in 1913 as chief clerk of the Meadville, Pa., plant. He has been works manager since 1942. Mr. Cox, formerly chief engineer, became associated with National Bearing in 1935 as a research engineer. He attended Washington University and Union College and was instructor of electrical engineering at Washington University between 1916 and 1918.

♦ ♦ ♦

J. A. Engstrom has been appointed foundry foreman, the Canedy-Otto Mfg. Co., Chicago Heights, Ill. Mr. Engstrom has been in the foundry industry since he was 17 years old, most of his experience having been in gray iron shops although he is also experienced in the working of steel and nonferrous metals. He had been foreman at the C. H. Milles Foundry Co., Chicago, for the last 22 years.

♦ ♦ ♦

Kenneth L. Walker has been appointed vice president in charge of production, Kalamazoo Stove & Furnace Co., Kalamazoo, Mich. A graduate of University of Illinois Mr. Walker later attended Northwestern University for graduate work, and for 14 years was engaged by various companies as department manager and consulting engineer in planning, engineering and production management methods. For the last 6 years he has been head of his own company, Walker & Associates, engineers, in Detroit.

♦ ♦ ♦

Dr. W. Irving Clark has retired as director of personnel, Norton Co., Worcester, Mass. Dr. Clark, who has been with the company for over 35 years, and is a nationally known figure in industrial medicine, will remain in charge of the Norton plant hospital. **Harry E. Howard** has been appointed manager of personnel. Mr. Howard has been associated with the company for 33 years, most of this period in various supervisory capacities in the abrasive division. He has been in personnel work for the last year.

♦ ♦ ♦

Dr. James T. MacKenzie, chief metallurgist, American Cast Iron Pipe Co., Birmingham, has been elected to that company's board of directors. **C. D. Barr** has been re-elected president of the company, **C. O. Hodges Sr.** vice president and treasurer, and **S. D. Moxley** vice president in charge of purchasing and engineering. **J. J. Swenson** has been re-elected vice president in charge of sales, and secretary, and **F. B. Shannon,** assistant secretary.

♦ ♦ ♦

Robert Langsenkamp, manager, Langsenkamp-Wheeler Brass Works, 1234 Shelby St., Indianapolis 3, has been named to the recently formed advisory committee of the Metal Working Industry Division, Association of Credit Men, Indianapolis.

♦ ♦ ♦

Fritz B. Ernst, vice president, American Steel Foundries, Chicago, retired Feb. 1. He had been associated with the company 40 years. Mr. Ernst was

(*Continued on page* 138)

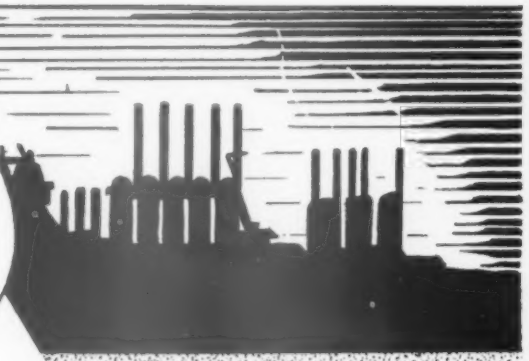
E. C. TROY

CHARLES R. ELLICOTT JR.

EMMETT A. WILLIAMS

I. E. COX

A bird's-eye view of WOODWARD IRON COMPANY



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(*Continued from page* 136)

born at Madison, Ind., and attended Purdue University. He was graduated in 1900 in civil engineering. From 1900 to 1902 he served on the staff of *Railway Age*. He returned to Purdue as instructor in car design, locomotive design and railroad engineering. In 1906 he joined the staff of Fitzhugh-Luther Co., Hammond, Ind., and in May 1907 became sales engineer for the American Steel Foundries in New York. In 1924 he was appointed assistant first vice president and in 1929, vice president, sales department.

♦ ♦ ♦

William V. Bush has been elected president, and **Walter V. Baker,** vice president, Detroit Sheet Metal Works, Detroit. Mr. Bush has been active in the management of the company for over 30 years. Mr. Baker, eldest son of the late president, **Wedworth V. Baker,** was released from Army service recently with the rank of major.

♦ ♦ ♦

Howard W. Kane, vice president and general manager, Kane & Roach Inc., Syracuse, N. Y., has been elected president of the company, succeeding his father, **William E. Kane,** who died recently.

♦ ♦ ♦

C. J. Nass is manager of West Coast Foundry Equipment Co., organized last year with offices in Los Angeles, San Francisco and Seattle, and which has been appointed to handle sales of foundry molding machines and coreblowing equipment in California, Oregon and Washington for the machine division of the Osborn Mfg. Co., Cleveland. **L. O Hofstetter,** formerly foundry engineer, Brumley-Donaldson Co., Los Angeles, and secretary of the Southern California Chapter of the AFA, is associated with Mr. Nass. **O. J. Stoudt,** who recently returned from 4 years of military service as a lieutenant in the medical department of the Army, has been appointed sales engineer for the company. Mr. Stoudt was associated with the Washington Eljer Co. for 6 years and later served as sales engineer for the Malleable Division, General Metals Corp. of Los Angeles. **H. M. Donaldson** will have charge of the San Francisco office and **W. A. Dewhurst,** the Seattle office, of the company. Both are graduates of University of California at Los Angeles and have been active in the foundry supply and equipment business for 10 years. **E. H. Brumley,** recently released as an officer by Army Air Corps, has joined the San Francisco office.

♦ ♦ ♦

H. S. Hersey has been re-elected president and general manager, and **C. J. Neville,** executive vice president and treasurer, the C. O. Bartlett & Snow Co., Cleveland. **B. A. Smith** has been named vice president, secretary, and director of engineering. **C. O. Bartlett** has been made vice president and director of sales, and **H. A. Christy,** vice president and director of manufacturing. **C. Ralph Willson,** manager of purchasing, and **John Hersey** are newly elected members of the board of directors.

♦ ♦ ♦

John L. Abbott recently joined North American Philips Co. Inc., New York, as application engineer in the industrial x-ray division. Mr. Abbott was born in Fairfield, Idaho, and was graduated from the Colorado School of Mines in 1941. He was employed by Wright Aeronautical Corp. from 1941 to 1946 as senior metallurgist.

♦ ♦ ♦

Ralph D. Holcomb has been appointed general sales manager, Harnischfeger Corp., Milwaukee. Mr. Holcomb joined the company 18 years ago and has directed sales in many sections of the country including Wisconsin, New York, Pennsylvania, Missouri, Tennessee and California, his latest position having been district manager for the San Francisco territory. He also served as sales manager of the company's large excavator division from 1940 until 1942.

♦ ♦ ♦

James G. Gammel has been appointed sales promotion and advertising manager, Brush Division, the Osborn Mfg. Co., Cleveland, succeeding **G. O. Rowland,** who has resigned to assume direction of the Northern Indiana Supply Co., Kokomo, Ind. Mr. Gammel, a graduate of Yale University, joined the sales promotion and advertising departments of Osborn in 1939 and later represented the company in the southern New England states. He served as a lieutenant in the Navy for three years, returning to Osborn last August.

♦ ♦ ♦

R. R. Adam has been appointed general sales manager of the Midwestern division, Corn Products Refining Co., New York, with headquarters in Chicago. **J. H. Healey** has been named to the same position in the Southern territory, and will be located in Memphis, Tenn. **A. G. Peterson,** in charge of the Eastern division, will remain in Philadelphia and **J. E. Walz** will direct Pacific coast division sales from San Francisco. All were vice presidents of Corn Products Sales Co., New York.

♦ ♦ ♦

George R. Lundberg has been appointed personnel manager of the machine and brush divisions, the Osborn Mfg. Co., Cleveland. Mr. Lundberg, who has spent 15 years in the accounting, production and sales divisions of the company, succeeds **T. W. Spoeri** who resigned recently.

♦ ♦ ♦

F. E. Scheven, factory manager since 1934, has been appointed vice president in charge of manufacturing, General Electric X-Ray Corp., Chicago. **F. J. Walters Jr.** has been made vice president in charge of employee and com-

(*Continued on page* 140)

WILLIAM V. BUSH

HOWARD W. KANE

L. O. HOFSTETTER

C. J. NASS

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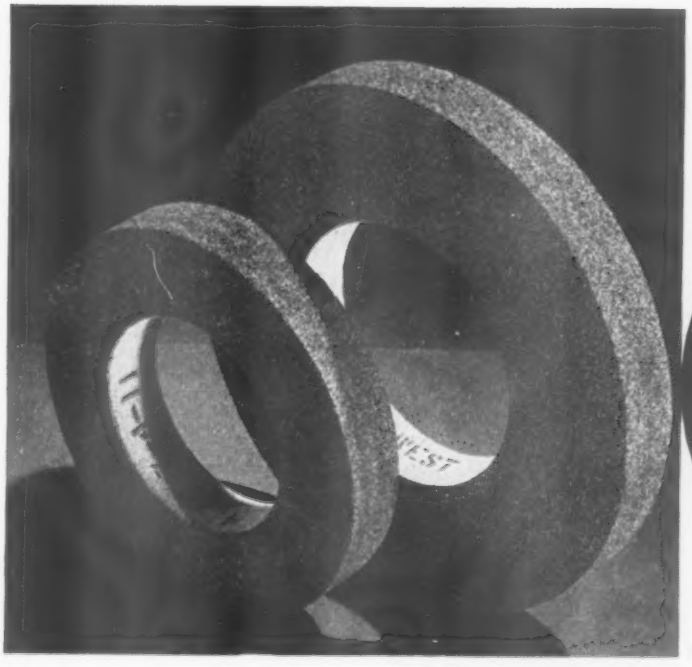

MID-WEST ABRASIVE CO.

Manufacturers of DEPENDABLE Abrasives

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ROCHESTER, PA.

(*Continued from page* 138)

munity relations. **M. J. Gross** has become vice president in charge of engineering. **W. S. Kendrick** remains vice president in charge of sales and **R. L. Frederick** continues as treasurer.

♦ ♦ ♦

William Kerber has been appointed vice president and general manager, Hanna Furnace Corp., Buffalo, succeeding the late **E. Kay Ford.** Mr. Kerber was eastern district sales manager for the company when he went to Washington in 1941 as deputy assistant director of the Steel Division and chief of the Raw Materials and Plant Facilities Division, War Production Board. He returned to Hanna Furnace Corp. in 1944, as assistant to the president.

♦ ♦ ♦

James G. Dick, author of the paper "Metallurgy in the Foundry", presented at the recent Toronto foundry conference sponsored by the Ontario and the Eastern Canada and Newfoundland chapters of the American Foundrymen's Association, has been appointed chief chemist and metallurgist, Canadian Bronze Co. Ltd., Montreal. Mr. Dick was born in Perth, Scotland, Oct. 22, 1920. For the past 10 years employed as chemist by the Canadian Bronze Co., he succeeds Harold J. Roast, who retired Mar. 1 to take up residence in California.

♦ ♦ ♦

Harold J. Roast, vice president, Canadian Bronze Co, and subsidiaries, and owner, Roast Laboratories, Montreal, prominently and widely connected with various phases of the metallurgical industry, retired Mar. 1, to take up residence in California. Born in London, England, and graduated from the City of London College, he went to Canada in 1902 as chemist with Milton Hersey & Co., Montreal. Later connections included Canada Iron Foundries, Radnor Forges, Que.; Canadian Carbonate Co., Ltd.; Canadian Magnesite Co., James Robertson Co., Ltd.; National Bronze Co., Ltd., Canadian Bronze Co. Ltd., as technical advisor in 1933 and vice president since 1935. During the recent war he was metallurgist in charge of shell production. For several years he was a board member of the American Institute of Metals; vice chairman, Canadian section, AFA; chairman, Nonferrous Division, AFA and was largely instrumental in organizing the Canadian Institute of Chemistry and Association of Professional Chemists, P. Q. At the 1946 convention Mr. Roast was made an honorary life member of the American Foundrymen's Association.

♦ ♦ ♦

Martin G. Levens has been appointed Cleveland sales representative for the Columbia Chemical Division, Pittsburgh Plate Glass Co., Pittsburgh. Mr. Levens was graduated from Gettysburg College in 1941 and became associated with the Atlas Powder Co., Wilmington, Del., as acid and powder line supervisor and later served as chief chemist. Following two years of Navy service from which he was released last July with the rank of lieutenant, he joined the sales department of Columbia Chemical Division.

♦ ♦ ♦

Floyd Jones has been appointed sales manager of the portable compressor division, the Davey Compressor Co., Kent, O. Mr. Jones has been northeastern district manager in charge of the New York, New England and southeastern Canadian territories for the last 2 years. He was New York manager of the Lidgerwood Mfg. Co. prior to his association with Davey Compressor.

♦ ♦ ♦

Frank A. Streiff, formerly southeastern sales manager for Southern Wheel Division, and sales representative for the Brake Shoe & Castings Division, American Brake Shoe Co., New York, has been appointed assistant vice president in the sales department of Southern Wheel Division, with headquarters in Portsmouth, Va. Mr. Streiff, a native of St. Louis, joined American Brake Shoe Co. in 1918 and has served in various sales capacities since 1926.

♦ ♦ ♦

H. J. Fraser and **H. J. French** have been elected vice presidents of the International Nickel Co. Inc., New York. Mr. Fraser joined the Huntington works of the company in 1923, following graduation from Queen's University, Kingston, Canada. He was made assistant manager of the production department of the New York office in 1935 and assistant vice president of the company in 1943. Mr. French was graduated from the School of Mines, Columbia University, in 1915. He joined the metallurgical staff of the U. S. Bureau of Standards, Washington, in 1919, following military service, and subsequently became assistant chief of the division of metallurgy. He became associated with International Nickel in 1929, and was in charge of alloy steel development for many years. He was appointed assistant manager of the Development and Research Division in 1943 and was recently appointed an assistant vice president of the International Nickel Co. of Canada Ltd.

♦ ♦ ♦

Dr. Harry A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, has been elected an honorary member of the Belgian Foundrymen's Association.

♦ ♦ ♦

S. L. Anderson, formerly associated with the Whiting Corp., Harvey, Ill., has been appointed sales representative for the E. R. Frost Co. Inc., Minneapolis.

♦ ♦ ♦

Jasper Gerardi, associate professor of engineering at the University of Detroit, has been appointed acting assistant dean in the College of Engineering. Prof. Ger-

(*Concluded on page* 142)

WILLIAM KERBER

JAMES G. DICK

HAROLD J. ROAST

★ BAY STATE SNAGGING WHEELS ★ BAY STATE SNAGGING WHEELS ★ BAY STATE SNAGGING WHEELS ★

Our aim . . . perfect control

Bay State's superior control in the manufacture of bonded abrasive products for the Foundry is your assurance of maximum grinding efficiency and economy of performance.

An additional refinement in resinoid snagging wheels is now offered by Bay State . . . *a more friable type of abrasive plus a new heat resistant bond, permitting a much wider choice of specifications.*

These new, faster cutting snagging wheels can be used with considerably less pressure. This means less wheel loss and therefore longer wheel life. Write us for particulars regarding trials.

Branch offices and warehouses—Chicago—Detroit
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BAY STATE

Top Performance Consistently Duplicated

BAY STATE ABRASIVE PRODUCTS CO. • WESTBORO, MASSACHUSETTS, U.S.A.

★ BAY STATE SNAGGING WHEELS ★ BAY STATE SNAGGING WHEELS ★ BAY STATE SNAGGING WHEELS ★

Foundry Sand Films Are Available

Available to the foundry industry is a series of motion pictures dealing with foundry sands. Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, offers these 16 mm color films which may be borrowed for short periods of time at no charge. Six films are available for distribution as follows:

"Hot Strength Test of Molding Materials," 10 minutes—Describes method of forming test specimen in 1⅛ x 2 in. sand rammer for the hot strength test. Film illustrates insertion of test specimen in furnace and loading sand in compression, penetration defect, method of increasing hot strength by reducing excessive addition of cereal binder, increasing hot strength by adding silica flour or fine sand for molding large castings, hot tear of steel casting due to excessive hot strength, testing hot strength of cores and methods of controlling the hot strength of molding sand and cores.

"Heat Shock Tests on Cores," 15 minutes—shows surface deterioration of cores at elevated temperatures, rate at which cores collapse, spalling of cores, views of casting defects due to spalling, fissure casting defects, methods for eliminating fissure casting defects and the effect of adding 2 per cent iron oxide at 2500 F.

"Study of Rat Tail Casting Defects," 15 minutes—Detailed study of rat tail casting defects is presented. Film also illustrates methods of testing sand at elevated temperatures with a dilatometer, expansion-contraction test in operation and methods of stabilizing sands to withstand the thermal shock which they receive in a mold.

"Rate of Core Collapsibility Is Important," part 1 and "Core Knock-out as Measured by Retained Strength," part 2, 10 minutes—Method of measuring the rate at which a core collapses at elevated temperatures is the subject of the first part. Fast and slow collapsing cores are shown under test, and the method of controlling rate of collapsibility is given. The second part shows the shaking out of castings and methods of measuring retained core strength are given.

"Mold Atmosphere," part 1, 15 minutes, part 2, 15 minutes—In part 1 the mechanics of combustible facing materials in foundry sand is explained to be derived from the protective reducing atmosphere that they produce. This is illustrated by a laboratory test. In part 2 the mothod of inserting a metal specimen ¼ in. diam in a 1⅛ x 2 in. rammed sand specimen for testing the effect of atmosphere on the surface of the metal pin, when subjected to elevated temperatures, is shown in detail. Views are shown of the surface protection obtained from sea coal, coke, sugar additions and other facing ingredients in molding sands.

Two New Foundries For General Motors

General Motors Corp. has announced that it will build a new malleable iron foundry in Danville, Ill., and a new gray iron foundry in Defiance, O. Both foundries will be operated by General Motors Central Foundry Division which now operates foundries in Lockport, N. Y., Saginaw, Mich., and Danville, Ill.

The new Danville plant will be built adjacent to the present gray iron foundry. It will have approximately the same floor space as the present plant and will be operated in conjunction with it. The Defiance plant will be built on a tract of 265 acres acquired by General Motors last fall.

Actual construction work on both plants will begin as soon as materials are available, and it is hoped ground can be broken by early spring, with the Danville plant ready to operate before the end of the year.

(*Concluded from page* 140)

ardi received his bachelor of civil engineering degree from University of Detroit in 1929 and his master of science degree from University of Michigan in 1935.

♦ ♦ ♦

Waldemar Meckes Jr. has been appointed advertising manager, the Werner G. Smith Co., Cleveland, succeeding **Louis F. Ferster** who has held that position for 32 years and who has been made general sales manager of Air Products Inc., Pittsburg, Kans. Mr. Meckes, a graduate of Dartmouth College, has been associated with the company for several years. During the recent war he served with the U. S. Marine Corps for 4 years and was retired with the rank of captain.

♦ ♦ ♦

Richard W. Parsons has been appointed technical director, Ohio Brass Co., Mansfield, O. Mr. Parsons, a graduate of Ohio State University, has been in the engineering department of the company for 20 years. He was appointed assistant metallurgist in 1929, plant metallurgist two years later and has been chief metallurgical engineer since 1942. A member of the Northeastern Ohio Chapter of the American Foundrymen's Association, Mr. Parsons is also a member of the American Society for Metals and represents his company on several committees of the American Society for Testing Materials.

♦ ♦ ♦

William H. Fellows has been appointed abrasive engineer in the midwestern area, Bay State Abrasive Products Co., Westboro, Mass., with headquarters in Chicago. Mr. Fellows, a graduate of University of Illinois, was associated with Phoenix Glass Co., Monaca, Pa., for a time, and later was appointed assistant ceramic engineer in the clay and silicate division of the National Bureau of Standards, Washington. For the last few years he has been closely associated with the sale and manufacture of foundry snagging wheels.

♦ ♦ ♦

E. R. Bisard has been appointed purchasing agent, Renown Stove Co., Owosso, Mich. Mr. Bisard has been associated with the company since 1936.

♦ ♦ ♦

Ronald Ryan, purchasing agent, Swayne-Robinson Corp. Inc., Richmond, Ind., has retired, and will make his home in Florida.

♦ ♦ ♦

C. F. Hudson has been appointed purchasing agent, Frank Foundries Corp., Muncie, Ind.

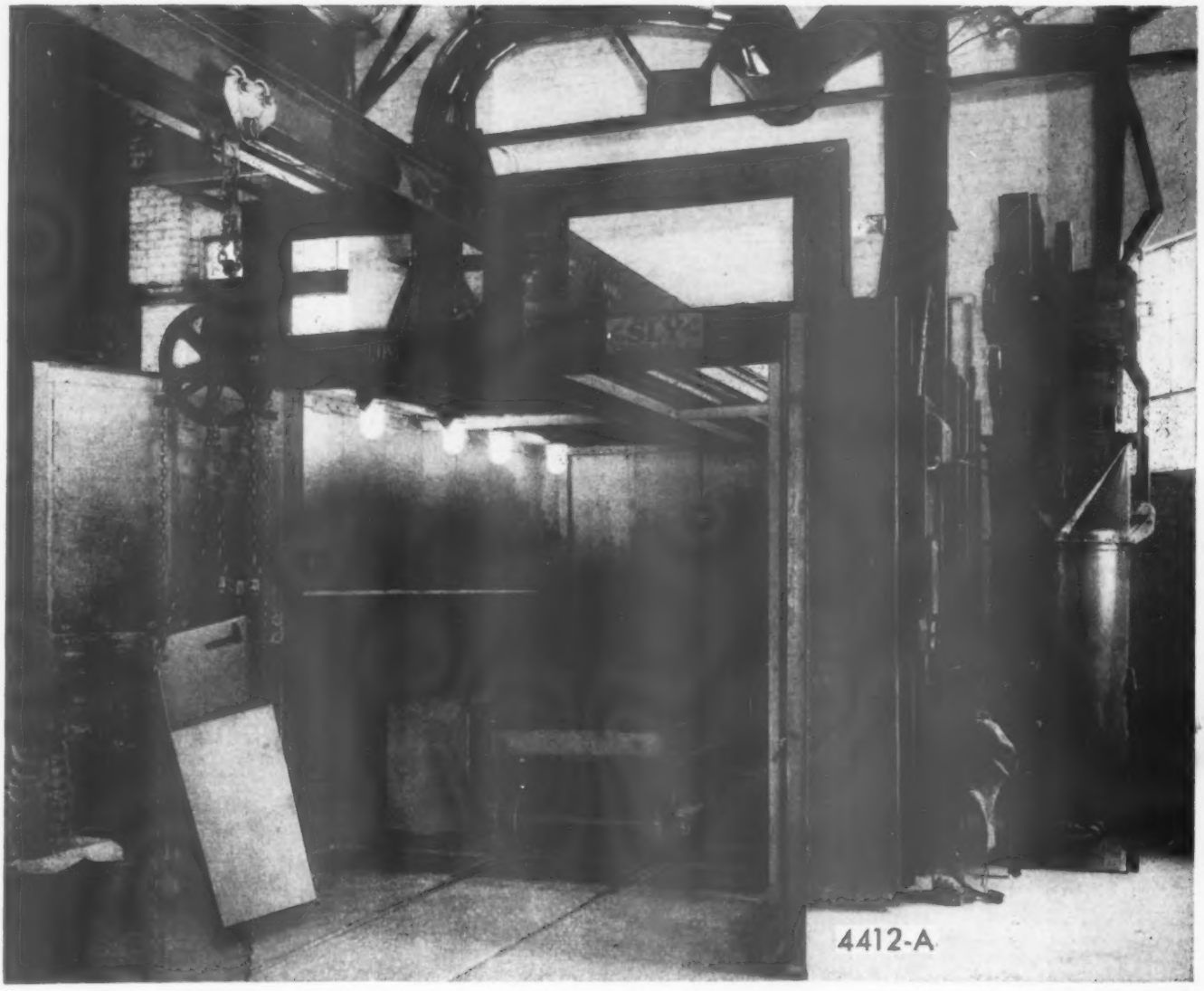
♦ ♦ ♦

Emil Thiem has been appointed core-room superintendent, Kendallville Foundry Inc., Kendallville, Ind.

WALDEMAR MECKES JR.

RICHARD W. PARSONS

WILLIAM H. FELLOWS



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DESIGNED FOR EFFICIENT CLEANING—RIGIDLY BUILT FOR LONG LIFE

Down-Draft Ventilation facilitates uniform entrance of air for ventilation.

A Triple Slotted Ceiling distributes the ventilating air all over the room, at the same time preventing the escape of rebounding abrasive.

Vent Ducts in two-room walls have inlet openings at bottom to draw the ventilating air and dust down.

Clear Vision is obtained by constant and effective exhaust of the dust.

Excellent Illumination is provided by special blast room lighting fixtures with glass globes ½" thick.

Steel Liners 3/16" thick are attached to inside of room walls and doors for wear protection.

Perforated Floor Plates are supported by a grating for a strong and safe floor.

Ask for the Sly Condensed Catalog describing our complete line of Dust Control and Sandblast Equipment.

Tell us about your cleaning problem.

THE W. W. SLY MANUFACTURING COMPANY • 4753 TRAIN AVENUE • CLEVELAND 2, OHIO

SLY INDUSTRIAL DUST CONTROL

TUMBLING MILLS • BLAST CLEANING EQUIPMENT

Corrosion Engineers To Hold Meeting

National Association of Corrosion Engineers will hold its 1947 conference and exhibition at the Palmer House, Chicago, on April 7 to 10. First day will be devoted to formal opening of the exhibition in the morning, with a general assembly in the afternoon. On Tuesday morning simultaneous sessions will be held at which corrosion problems in the water and chemical industries will be discussed. On Wednesday sessions will be held on communications, oil, electrical and gas industries, with the annual banquet in the evening. On Thursday simultaneous meetings on general industry and cathodic protection will be held.

Seeks Questions on Refractories

A feature of the Refractories Section program for the coming AFA convention in Detroit will be a question and answer period to be held at 4 p.m., Tuesday, April 29. Anyone having a question regarding refractories or their use in any branch of foundry work is urged to submit it in advance, addressing the chairman for the session, Richard H. Stone, Vesuvius Crucible Co., Pittsburgh 18.

AFA Committee On Alloys Is Named

H. J. Rowe, chief metallurgist, castings division, Aluminum Co. of America, Pittsburgh, is chairman of the 1947 alloy recommendation committee, aluminum and magnesium division of American Foundrymen's Association. Other members are David Basch, technical representative, Almin Ltd. of Great Britain, Schenectady, N. Y.; Hiram Brown, resident chief metallurgist, Solar Aircraft Co., Des Moines, Iowa; J. C. Fox, chief metallurgist, Doehler-Jarvis Corp., New York, and J. W. Wheeler, Wheeler Consultancy, Springfield, Mass.

Foundry Statistics

(Reported by Bureau of the Census)

Copper-base Alloy Castings

(Thousands of pounds)

	Shipments			Unfilled
	Total	Sand	Perm. Mold	*Orders
1946				
Jan.	72,265	65,107	1,886	71,827
Feb.	60,856	56,992	1,713	72,736
Mar.	74,971	66,076	2,353	70,622
Apr.	77,919	71,105	2,390	71,108
May	76,054	70,748	2,453	76,792
June	70,910	66,378	1,755	78,449
July	66,695	62,369	2,339	78,018
Aug.	77,733	72,158	2,376	77,538
Sept.	76,835	71,545	2,415	84,183
Oct.	89,148	83,610	2,559	80,770
Nov.	77,605	72,671	2,159	79,126
Dec.	77,961	73,278	2,122	80,445

* For sale only.

Gray Iron Castings

(Net tons)

	Shipments		Unfilled
	Total	For sale	*Orders
1945			
Jan.	861,524	536,499	1,921,572
Feb.	816,467	511,184	1,998,270
Mar.	927,925	587,380	2,089,046
Apr.	842,979	532,015	2,031,668
May	866,951	542,337	2,031,318
June	849,449	543,788	2,015,625
July	748,790	468,017	2,015,005
Aug.	750,050	462,364	1,817,801
Sept.	717,768	434,416	1,754,515
Oct.	767,209	461,720	1,741,981
Nov.	751,092	445,952	1,847,468
Dec.	678,091	397,529	1,877,095
1946			
Jan.	706,319	446,567	2,076,994
Feb.	541,177	368,384	2,152,766
Mar.	796,068	505,431	2,265,336
Apr.	856,678	529,323	2,378,348
May	757,041	454,194	2,491,811
June	735,060	435,866	2,633,118
July	810,829	475,059	2,668,782
Aug.	944,516	558,957	2,785,609
Sept.	913,824	534,310	2,881,906
Oct.	1,051,068	610,389	2,916,268
Nov.	964,300	552,696	2,888,219
Dec.	889,479	505,728	2,952,203

* For sale only.

Aluminum Castings

(Thousands of pounds)

	Shipments			Unfilled
	Total	Sand	Perm. Mold	*Orders
1945				
Jan.	45,588	27,168	10,692	.....
Feb.	44,091	26,674	9,844	.....
Mar.	50,275	29,473	12,355	.....
Apr.	46,320	27,090	11,185	.....
May	43,323	24,398	10,977	.....
June	39,074	21,050	10,254	.....
July	31,130	15,573	8,859	.....
Aug.	22,843	11,384	6,568	.....
Sept.	15,805	7,313	5,325	.....
Oct.	19,825	8,410	7,647	.....
Nov.	18,961	8,137	7,305	.....
Dec.	17,770	7,222	7,248	.....
1946				
Jan.	23,568	9,556	10,131	83,541
Feb.	23,231	11,613	7,866	94,858
Mar.	26,661	10,792	11,305	97,013
Apr.	27,692	11,562	11,010	100,267
May	29,179	11,827	12,220	117,710
June	28,496	11,674	11,767	118,747
July	28,828	10,706	12,213	124,457
Aug.	33,845	12,721	14,309	133,510
Sept.	32,003	12,445	13,045	136,237
Oct.	39,917	14,559	17,311	144,276
Nov.	35,635	13,192	15,440	138,270
Dec.	34,754	12,827	14,586	137,198

* For sale only.

Malleable Iron Castings

(Net tons)

	Shipments		Unfilled
	Total	For Sale	*Orders
1945			
Jan.	78,788	54,111	345,112
Feb.	75,220	51,089	341,538
Mar.	85,307	58,711	349,935
Apr.	76,065	51,011	346,421
May	79,565	52,789	328,471
June	71,992	47,510	285,210
July	55,813	35,439	284,017
Aug.	52,647	33,239	282,136
Sept.	46,960	28,506	219,905
Oct.	59,096	37,307	229,618
Nov.	57,315	36,007	227,309
Dec.	51,963	35,168	236,648
1946			
Jan.	53,685	38,181	245,878
Feb.	40,156	29,338	247,644
Mar.	50,235	33,978	263,227
Apr.	65,010	36,298	275,055
May	62,598	34,975	279,065
June	61,650	35,468	275,845
July	64,446	38,021	271,981
Aug.	67,903	41,345	272,440
Sept.	69,516	39,634	277,309
Oct.	79,207	46,477	280,972
Nov.	68,987	39,328	278,446
Dec.	68,314	39,327	267,661

* For sale only.

Magnesium Castings

(Thousands of pounds)

	Shipments			Unfilled
	Total	Sand	Perm. Mold*	Orders†
1945				
Jan.	10,424	6,149	4,028	....
Feb.	10,366	5,832	4,317	....
Mar.	12,646	6,703	5,677	....
Apr.	11,903	6,257	5,464	....
May	12,134	6,081	5,865	....
June	10,566	4,878	5,473	....
July	9,838	3,961	5,677	....
Aug.	4,960	1,820	3,036	....
Sept.	169	137	13	....
Oct.	251	216	13	....
Nov.	236	208	15	....
Dec.	261	230	14	....
1946				
Jan.	398	349	16	3,114
Feb.	438	366	35	3,338
Mar.	594	525	33	3,484
Apr.	570	465	36	3,297
May	661	587	45	3,778
June	717	623	46	4,063
July	628	477	53	3,986
Aug.	694	568	56	4,234
Sept.	811	676	61	4,096
Oct.	921	733	73	4,219
Nov.	716	574	41	4,294
Dec.	717	635	28	4,599

* Includes incendiary bomb castings.
† For sale only.

Steel Castings

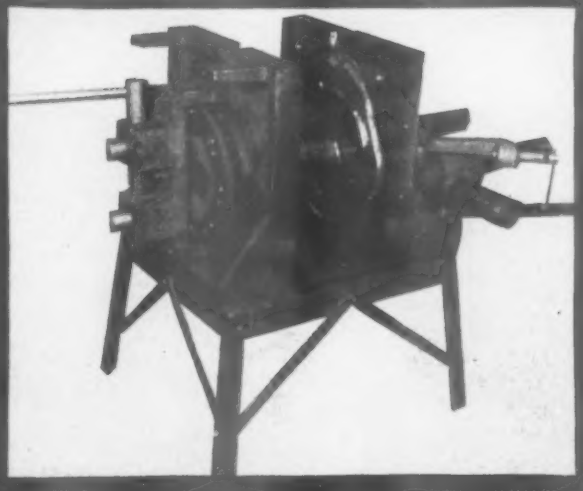
(Net tons)

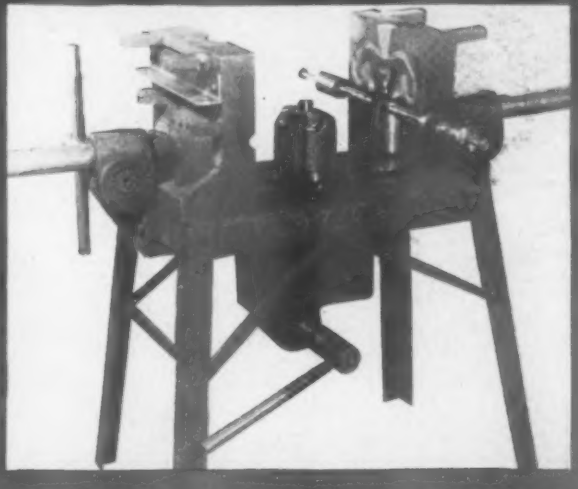
	Shipments		Unfilled
	Total	For Sale	Orders
1945			
Jan.	210,213	165,116	983,137
Feb.	191,361	152,082	1,045,374
Mar.	222,591	173,506	1,047,660
Apr.	197,737	154,883	1,018,930
May	192,921	149,623	852,877
June	173,685	129,193	776,265
July	139,315	102,428	728,397
Aug.	131,411	98,080	565,559
Sept.	114,613	83,751	513,758
Oct.	130,344	99,495	460,339
Nov.	123,048	91,409	443,773
Dec.	115,239	85,391	434,287
1946			
Jan.	99,058	77,071	*358,926
Feb.	57,423	45,151	390,077
Mar.	101,396	80,843	412,325
Apr.	146,327	108,586	392,790
May	129,211	94,630	381,654
June	123,551	91,715	361,293
July	119,157	84,422	362,581
Aug.	130,450	94,653	374,731
Sept.	126,415	90,675	383,951
Oct.	138,206	98,945	389,002
Nov.	130,813	93,930	378,631
Dec.	122,219	87,238	353,860

* For sale only. Unfilled orders for 1945 include tonnage for sale and own use.

CHECK THE ADVANTAGES OF THE

Permanent Mold System





1. Increased Production
2. Improved Casting Quality
3. More Attractive Appearance
4. Closer Dimensional Tolerance
5. Economical Casting Production
6. Less Polishing and Machining

FREE ON REQUEST—Reprints of the article "Permanent Molds for Casting" which appeared in the August 1946 issue of *The Foundry*, are available on request. This article well illustrates the permanent mold system and gives the advantages and disadvantages of this system.

MASTER PATTERN COMPANY

1315 MAIN AVENUE — CLEVELAND 13, OHIO

DESIGNERS AND MANUFACTURERS OF PERMANENT MOLDS, WOOD AND METAL PATTERNS AND MODELS

MULTI-PURPOSE

- Replaces the Airblast Room —handles at least 80% of this class of work.
- Handles wide range of work—for shops desiring a versatile machine.
- Hygienic—the operator works outside the cabinet.
- Airless—for faster, cheaper, more efficient production.
- Saves power, labor, space

Here is a machine that disposes of the slow, high cost, unhygienic disadvantages inherent in Airblast Room operation . . . a fact that close to a 100 foundries have already proved to their complete satisfaction. Equally important is the fact that the machine serves admirably as a versatile, general-purpose unit for the shop requiring a single, moderately-

A 66" Wheelabrator Swing Table replaced twelve tumbling mills and an airblast room at the Western Land Roller Co., Hastings, Neb. It is cleaning 10 to 14 tons of gray iron castings in six to eight hours.

•

6 to 7 tons of green stove and furnace castings are cleaned in 8 hours by the Wheelabrator Swing Table installed at the Empire Stove and Furnace Co., Ltd., Owen Sound, Ontario. From 1200 to 1400 pieces are cleaned in a single 8 hour period . . . a job formerly requiring nine tumbling mills and an airblast room.

•

At the Toronto Foundry Co., Ltd., Toronto one man and a Wheelabrator Swing Table clean the entire production of 6 to 7 tons in 7 hours. This installation eliminated three large tumbling mills which had required two operators working 8 hours each.

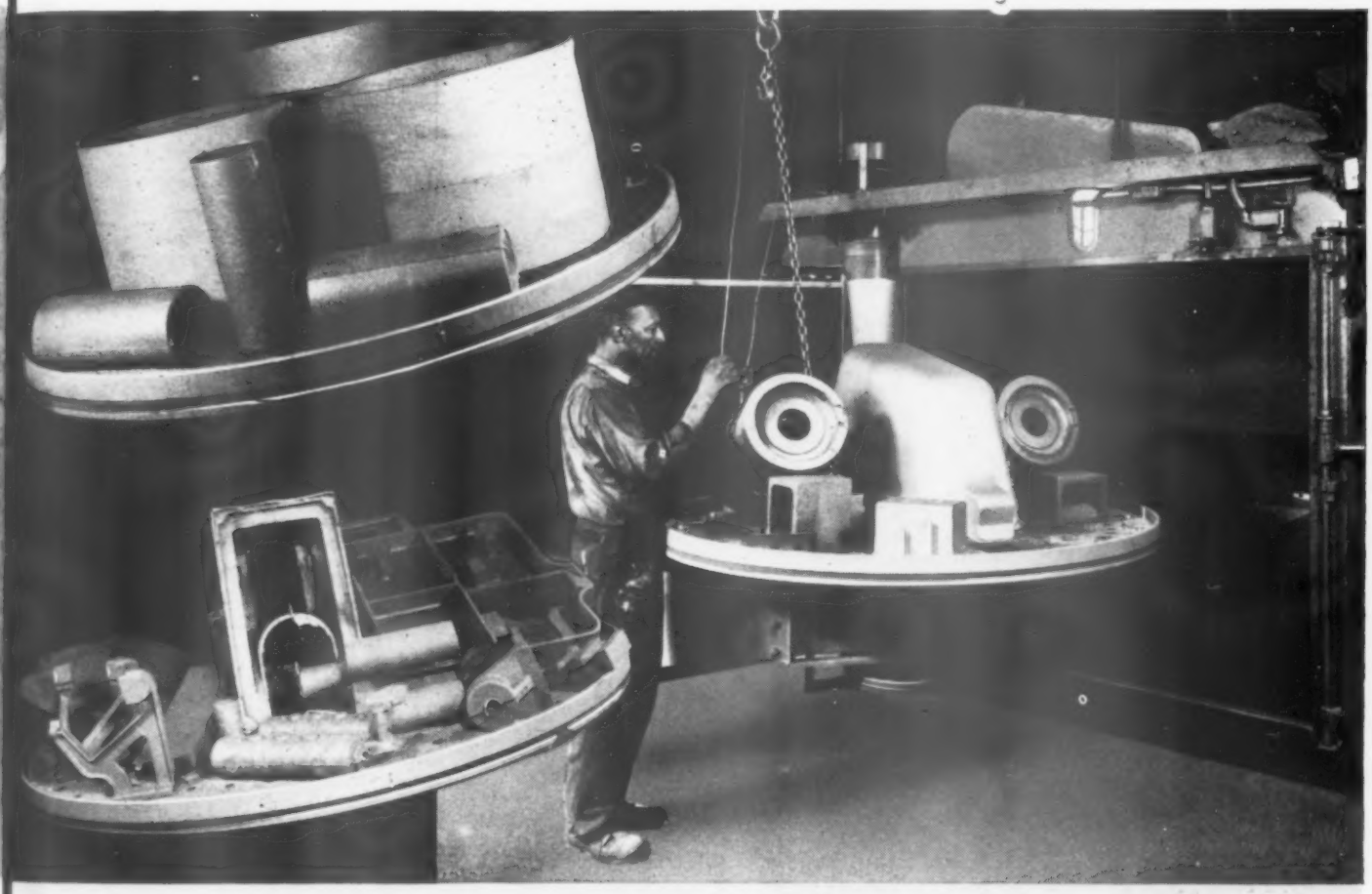
WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

Wheelabrator Swing Table

priced equipment capable of handling work of a wide variety of shapes, sizes, and weights.

Opening the door of the machine brings the work table into position for loading or unloading. Closing the door brings the table beneath the blast of one or more Wheelabrator units where it rotates within the blast stream so that all surfaces and cored areas are scoured to a bright clean finish.

By combining Wheelabrator speed cleaning with the versatility of the Swing Table we have developed a moderately priced machine of broad usefulness that meets present day requirements for speed and economy of production. Made in 5 sizes. Write for Catalog 214-A.



The speed, economy and versatility of all five sizes of Wheelabrator Swing Tables are graphically described in Catalog No. 214-A. Write today for your free copy.

American

WHEELABRATOR and EQUIPMENT CORP.

(Formerly American Foundry Equipment Co.)

505 S. Byrkit Street — Mishawaka, Indiana

Around DETROIT

By A. M. ALLEN
Detroit Editor
THE FOUNDRY

Charges of discrimination fly as consumers scramble for foundry pig iron . . . . Recent pace of car and truck assemblies indicates 5-million unit goal may be surpassed this year

ARGUMENTS over just who is getting the lion's share of the nation's merchant pig iron production have been flying thick and fast over the past 30 days. They were touched off by voluble complaints from the Warner Gear Division of Borg-Warner Corp. to the effect discriminatory allocations of merchant iron under CPA conservation order M-21 were crippling production of automotive castings which Warner Gear buys in large quantities (about 1000 tons per week). The claim was made that 50 per cent of total merchant iron production was being channeled to the southern stove and cast iron pipe industry; that these melters were using practically 100 per cent pig iron instead of former 100 per cent scrap, because of price advantage and availability; that iron in excess of requirements was being allocated to the South, some of which was finding its way back North at premium prices.

The inference was that unless congressional action was forthcoming promptly, dozens of northern foundries were going to suspend operations in a matter of days because of depleted raw material inventories.

Partly, at least, as a result of the protests, CPA decided all allocations of pig iron for housing materials, excepting soil pipe, would cease March 31. However, Harry L. Smith, acting director of the review and analysis branch of the Office of the Housing Expediter, in a letter addressed to the Gray Iron Founder's Society, a carbon copy of which was addressed to this editor, presented some statistics which appeared to refute the previously mentioned plight of automotive foundries. Quoting, in part, he says:

"The foundries producing castings for automobiles, appliances, motors, farm implements, etc., are primarily in the North, and draw their pig iron from the North. Exclusive of the Alabama area, blast furnaces in the rest of the country have had less than 25 per cent of their output certified under Direction 13 to Order M-21, the order which presumably channels material for housing. Therefore, the remainder, or 75 per cent of the pig iron, goes to gray and malleable iron foundries making other items. . .

"The automobile industry has been the principal complainant on shortages and . . . the statement is made that 'the automobile industry is probably receiving less than 50 per cent of its pig iron requirements that were received for an average normally good year.'

"Taking the output of foundry and malleable grades of pig iron in the U. S., exclusive of the South, the statistics on output as given to this agency show the following:

"Production (gross tons):

1939 average monthly output	168,400
1940 average monthly output	215,000
1941 average monthly output	280,000

"Deliveries (gross tons, from CPA reports):

September, 1946		310,900
October, 1946		336,100
November, 1946		318,600
January, 1947	(est)	299,500
March, 1947	(est)	296,500

(December, 1946, omitted because of effect of coal strike; February, 1947, because it was a short month)."

Mr. Smith continues: "Of the above amounts, from 68,000 to around 75,000 tons have been certified. Authoritative sources have been checked and rechecked and it appears that these same housing foundry consumers would receive without allocations at last 50,000 tons a month. Thus, assuming they would receive that amount, the other foundries, including automotive, would have in the above period received from 246,000 to 268,000 tons of pig iron a month. This is almost the same as the peak 1941 deliveries of 280,000 tons a month and much more than in what is termed 'an average normally good year.'

"It is believed that compared with 1939, the automobile foundries are receiving far more now than then and probably about the same as in 1941. Unless the blast furnaces are unduly discriminating against the automobile foundries in favor of other nonhousing foundries, the statement that they are receiving only 50 per cent of a normal prewar year appears to be inaccurate."

The figures seem to substantiate the position of the housing expediter, yet Warner Gear says one of its castings suppliers claims its sole pig iron supplier (largest producer in the U. S.) was forced to deliver 87 per cent of its production to southern users, and was unable to make deliveries of iron during February and March. Warner also lists 15 sources of gray and malleable iron which have been affected by pig iron shortages.

Perhaps the difficulty will be lessened by terminating certifications as of the end of the first quarter on all housing items except soil pipe. The latter might have been included too except that the industry advisory committee reportedly could not agree on a system of voluntary allocations on iron for pipe foundries. This lone remaining control probably will expire June 30.

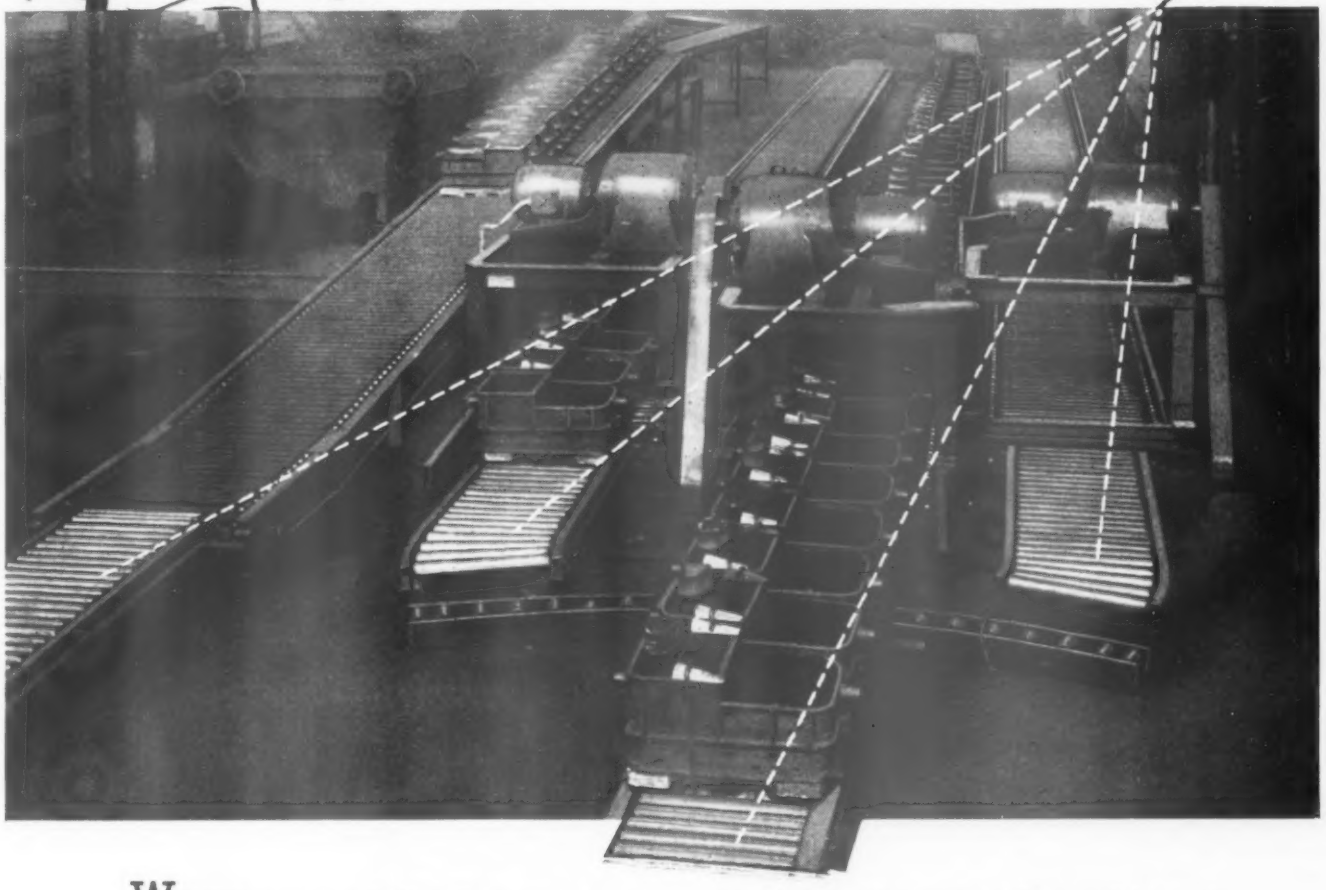
Furnace Output Reduced

A person in position to observe this condition from the government standpoint recently stated that the real cause of the current difficulty is an over-all drop in the output of foundry and malleable grades of pig iron. A major eastern producer of foundry iron is apparently running at only 50 per cent of his output of last fall, with the difference going into basic iron for steel mills. Another large northern producer has dropped his output of foundry iron 10,000 tons a month. A third, who attributes his cutbacks in deliveries to his customers to the housing certifications, fails to mention that he has cut his production of foundry iron by almost 50 per cent, favoring his steel mill customers. In the opinion of this government observer if the blast furnace industry continues to favor the production of steelmaking grades of iron, the economy will be thrown out of balance, and the presence or absence of housing allocations will not make an iota of difference. Recent gyrations of the scrap market pricewise demonstrate graphically what intense competition for limited supplies, together with more than a few unprincipled actions on the part of both buyers and sellers, will do to a basic commodity.

Blame for the situation also must be assigned in part to a carryover of wartime practices in the scrap market which worked reasonably well as long as government controls were in force, but which boomeranged when the lid was lifted. Most large tonnages of production scrap these days are channeled back to a certain steel mill, usually the mill which furnished the original steel. Result is a virtual freezing of a large section of the market and intense competition for what is left. Thus, when a mill covers on a specific tonnage through a dealer or

(*Concluded on page* 150)

There IS a Great Difference in Roller Conveyer



WHEN you buy Roller Conveyer, keep in mind the service that you should expect from it. While two sections of different manufacture may appear to be of identical design, actually there is probably a vast difference in them. The gauge and quality of tubing used — the design of the bearings and the method of their lubrication. The size and style of axles, and the method of securing them in the frames. The construction and crossbracing of the frames. The couplings and supports. The weight and strength of the section. These are points which should be considered important. They quickly show that there is a difference in Roller Conveyer.

There is 40 years' experience behind Mathews Roller Conveyer. It is engineered to give long, efficient service, and each section is designed to meet specific customer requirements. We will gladly mail you complete data without obligation.

Mathews Conveyer Company
Ellwood City, Pennsylvania

(*Concluded from page* 148)
broker at a particular price and the dealer goes short this tonnage, hoping to cover at a later date, he finds himself forced to pay a substantially higher figure because there is so little material available and other short accounts are bidding up the price.

On top of this are all kinds of special deals in steel and scrap, often involving persons of questionable character who have never had the remotest connection with markets for these materials but are always ready to move into anything where a quick dollar can be turned with no work involved. Volumes could be written—but never will be—about these deals which are a sorry blot on American business methods.

• • •

ASSEMBLIES of automobiles and trucks for the past six weeks have been running better than 100,000 per week, with the February total approximately 400,000 and the indicated March total 450,000. This performance is distinctly encouraging in view of the multitude of materials problems involved. It brings first-quarter production to around 1,225,000 cars and trucks and represents an annual level of nearly 5,000,000. If plans to push April output to 500,000 are successful, it appears entirely likely the industry will achieve its five-million goal this year, perhaps even surpass it.

Increasing concern is being expressed over the price problem. Soaring costs of raw materials and parts are forcing automotive cost departments to keep a constant check on their manufacturing costs, and at the same time a 50 per cent higher level of retail prices has washed many prospective buyers out of the market. Further boosts in prices have been hinted by some executives, but it is a move they hate to take, realizing the danger of pricing themselves out of a lot of business. However, they cannot build cars at a loss, and must keep constantly in mind the possibility of having to pay higher wage rates once current negotiations over renewing union contracts are concluded. Action of the steel industry on wages is generally considered to be the coming tipoff on what other industries will be forced to do.

FOUNDRYMEN TRAINING

Inaugurated by Nonferrous Group

ON-THE-JOB training of men for supervisory positions in the nonferrous foundry industry is being sponsored by the Non-Ferrous Founders' Society Inc., 127 North Dearborn St., Chicago 2. This training program linked with the "G. I." Bill of Rights and in conjunction with the Veterans' Administration, is designed to furnish nonferrous foundries with qualified men trained in all phases of foundry management and production.

Any veteran with or without higher education, although from one to two years of college education in pre-engineering is preferred, capable of taking an advanced education program is eligible for this training program.

In operation the plan provides for any nonferrous foundry to select one of its men who is eligible. For a period of two years he successively is a foundry laborer, coremaker, molder, melter, and office man. A four-month period is devoted to each of these jobs with the exception of molding which takes eight months. During each such period he will work in the foundry during the day following a prescribed program and go to night school from 3 to 6 hours per week to study the subjects outlined.

With the exception of two subjects, the required evening instruction can be obtained in any school of higher education and in some instances where these institutions are not available can be arranged in public high schools.

At the end of each period each foundry will report to the association offices concerning its trainee's adaptability and progress in the foundry and his night school grades in the related instruction program. If both courses are completed satisfactorily within two years, the society will issue a certificate to the trainee showing that he has satisfactorily completed the course.

Proper credit will be given all trainees for previous work experience or educational background. Even with such credits, however, it is not expected that the course can be completed in less than 18 months.

Trainees will start at $1 per hour, with a 10c-per-hour increase at the end of each four-month period so that the hourly wage for the last period will be $1.50 per hour. Base pay after successful completion of the course will be not less than $300 per month.

The foundry work part of the program consists of six 640 hour (4 month) periods, with the work of the trainee being done under a competent supervisor or foreman. Instruction will be given in the following phases of foundry practice:

General Foundry Work—Cutting over sand; dumping molds; use of weights; core clean up; cleaning castings; cutting and sawing off heads gates and risers; grinding; sand blasting and other cleaning methods.

Coremaking—Mix core sands and bonds of various types and learn their uses; make simple cores and advance to intricate cores; reasons for venting and re-inforcing cores; proper methods of drying and temperature control; become familiar with modern methods and equipment.

Molding—Work with mechanical aids such as squeezers, jolt machines, jolt roll-over machines, etc.; start with simple jobs on plates and learn how to place sprues, gates and risers; pour molds; set cores and learn the use of cores.

Molding—Mold with loose patterns on the bench, advancing to floor and dry sand work; additional instruction on gates, risers, etc.; learn use of facings and washes; handling and barring of flasks; re-inforcement of molds.

Melting—Learn about scrap and ingot metals and the use of pyrometers; proper pouring temperatures and preparation of alloy mixtures; proper use, care and repair of all types of melting equipment; use of deoxidizers and fluxes.

General—Instruction in bookkeeping and cost methods; costing and analysis under a uniform system; hiring and placement of employees; selling, purchasing and stock records.

The related instruction plan is also divided into six periods and is mandatory in the training program:

1. Refresher course in higher mathematics with special attention to algebra and geometry.
2. Mathematics continued if necessary. Blueprint interpretation. Study of sands and binders.
3. and 4. Advanced physics or chemistry (whichever is needed).
5. Reading course in metallurgy.
6. Special instruction in foundry costing in accordance with simplified and expanded manuals which have been prepared and which are in process of reprint and sponsored by the society. Special training in stock and pattern records and general foundry records. Courses in personnel, business methods and accounting.

SAND CONTROL

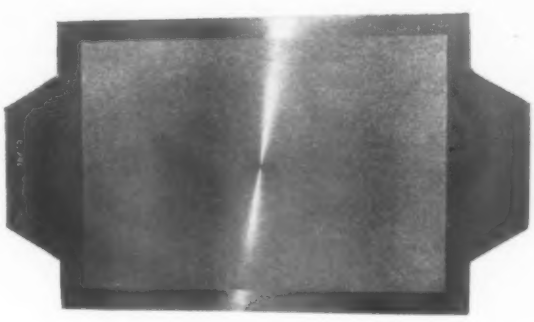
(*Continued from page* 112)
the test is used principally to get some idea of the clay content in core sands. The test can also be used on higher clay content sands with good results, provided the fines are low. As in the case of the standard clay wash-out test, a caustic material is used to free clay adhering to the grain, and thus a truer picture of the actual clay present is obtained.

The combustible test checks on the amount of combustible matter in the molding sands. Such materials include seacoal, unburned oils, wood flour, and other burnable matter in the sand. The test is quite simple, though quite lengthy, and is performed on inexpensive equipment. It is not wholly accurate but it suffices for the purpose intended. A 10-g sample is placed in a porcelain crucible and is subjected to bunsen-burner fire for approximately two hours, in which time the black sand has taken on a light-brown color. The specimen is allowed to cool and is then reweighed. The loss in weight multiplied by ten gives the percent of combustible matter present. The setup for the test is shown on the ring stand in Fig. 5.

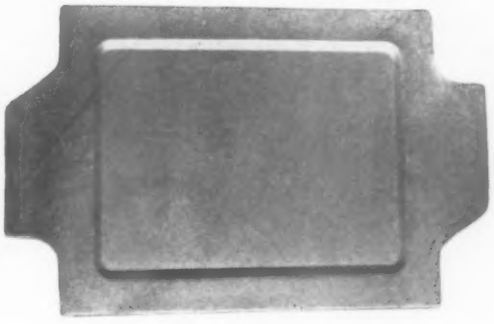
(*Concluded on page* 152)

A NEW MACHINED PLATE—SUPERIOR NOSLIP

IS ANNOUNCED BY THE MANUFACTURERS OF THE WELL KNOWN SUPERIOR FLAT AND OFFSET PLATES. SUPERIOR NOSLIP PLATES ARE ACCURATE TO .002 AND SAND BLASTED INSIDE OF THE FLASK LINE TO PREVENT MOLD SLIPPING.



SUPERIOR NO SLIP



SUPERIOR COPE AND DRAG

SUPERIOR OFFSET

PRICES

Flask Size	3/8"	1/2"	3/4"
10 x 14	$7.25	9.50	
10 x 15	8.00	10.50	
10 x 16	8.25	11.00	
10 x 17	8.75	11.75	
10 x 18	8.75	11.75	15.00
10 x 19	9.50	12.75	16.00
10 x 20	10.15	13.50	18.00
10 x 22	11.50	14.75	22.00
10 x 24	12.50	16.50	25.00
10 x 26	13.25	17.50	27.00
10 x 28	14.75	18.50	28.00
10 x 30	15.50	20.00	29.00
10 x 32	16.50	21.50	30.00
11 x 14	7.75	9.75	
11 x 15	8.00	10.50	
11 x 16	8.50	11.25	
11 x 17	9.00	12.00	
11 x 18	9.50	12.50	18.00
11 x 19	9.90	13.25	20.00
11 x 20	10.40	14.00	21.00
11 x 22	10.50	14.75	23.00
11 x 24	11.50	15.00	24.00
11 x 26	13.00	17.25	25.00
11 x 28	14.00	18.50	27.00
11 x 30	16.00	20.00	30.00
11 x 32	17.00	22.00	31.00
12 x 12	7.50	10.00	
12 x 13	8.00	10.50	
12 x 14	8 50	11.25	
12 x 15	8.75	11.75	
12 x 16	9.00	12.00	17.00
12 x 17	9.50	12.50	18.00
12 x 18	10.00	13.25	19.00
12 x 19	10.75	14.25	20.00
12 x 20	11.75	15.00	23.00
12 x 22	12.75	17.00	26.00
12 x 24	14.50	18.50	28.00
12 x 26	15.25	20.50	30.00
12 x 28	17.00	22.75	34.00
12 x 30	19.00	25.25	37.00
12 x 32	20.00	26.75	38.00
12 x 34	21.00	28.00	39.00
12 x 36	22.50	30.00	40.00
13 x 13	8.50	11.25	
13 x 14	8.75	11.75	
13 x 15	9.00	12.00	
13 x 16	9.50	12.75	
13 x 17	10.25	13.50	
13 x 18	11.25	15.00	20.00
13 x 19	12.00	16.00	23.00
13 x 20	13.25	17.50	25.00
13 x 22	14.25	18.50	27.00
13 x 24	15.25	20.50	29.00
13 x 26	17.00	22.75	33.00
13 x 28	18.00	24.00	35.00
13 x 30	20.00	26.50	40.00
13 x 32	22.00	29.00	42.00
13 x 34	24.00	32.00	45.00
13 x 36	26.00	34.50	47.00
14 x 14	9.25	12.50	16.00
14 x 15	9.90	13.25	17.00
14 x 16	10.25	13.50	18.00
14 x 17	11.00	15.00	20.00
14 x 18	12.25	16.00	22.00
14 x 19	13.00	17.50	23.50
14 x 20	13.75	18.25	25.00
14 x 22	14.75	20.00	29.00
14 x 24	17.50	22.50	33.00
14 x 26	18.50	24.50	35.00
14 x 28	19.75	25.50	37.00
14 x 30	21.00	28.00	40.00
14 x 32	24.00	32.00	43.00
14 x 34	26.00	34.50	46.00
14 x 36	28.00	35.00	48.00
15 x 15	11.00	14.75	20.00
15 x 16	12.00	16.00	21.00
15 x 17	13.00	17.25	22.00
15 x 18	13.75	18.25	24.00
15 x 19	14.50	19.25	27.00
15 x 20	15.25	20.00	30.00
15 x 22	16.25	21.50	31.00
15 x 24	17.00	22.50	32.00
15 x 26	19.00	25.00	36.00
15 x 28	22.00	29.00	38.00
15 x 30	24.00	32.00	41.00
1C x 16	13.00	17.25	22.00
16 x 18	14.25	19.00	24.00
16 x 20	16.00	21.00	29.00
16 x 22	17.50	23.00	33.00
16 x 24	20.00	26.00	34.00
16 x 26	22.00	29.00	35.00
16 x 28	23.00	30.00	38.00
16 x 30	25.00	33.00	42.00
18 x 18	18.75	25.00	33.00
18 x 19	19.25	25.50	34.00
18 x 20	20.00	26.50	35.00
18 x 22	22.00	29.00	36.00
18 x 24	23.00	30.50	37.00
18 x 26	24.00	32.00	38.00
18 x 28	25.00	33.50	40.00
18 x 30	27.00	35.00	43.50
20 x 20	20.25	27.00	35.00
20 x 24	23.00	30.00	40.00
20 x 30	28.00	35.00	48.00

Discount less than 6 net; 7-12 less 5%; 13 to 50 less 10%; over 50 less 15%.

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Flat Velvet finish plates from 10x14 to 20x30; 3/8, 7/16, 1/2 and 3/4" thick.

Cast Offset plates velvet finish from 10x14 to 20x30 3/8, 7/16 and 1/2" thick.

Cope & Drag Cast Plates; Flat, Offset or Machined with or without Ribs to your specifications.

All measurements are flask size. We will quote on any requirement for pattern plates.

Manufactured and distributed by:

DEALERS ASK FOR DISCOUNT

THE PMS CO.

1071 Power Ave. Cleveland 14, Ohio

MANUFACTURERS OF SUPERIOR PATTERN SHOP SUPPLIES

(*Concluded from page* 150)

Combustible matter is kept below 8 per cent. The test indicates when the foundry is heading for possible trouble and checks can be made for the source of excess tramp material.

The special hydrocarbon test is performed with the equipment also shown in Fig. 5. It is a most accurate test. On laboratory tests with new materials, it was revealed that whatever amount of the hydrocarbon was placed in the sand, the same amount showed up in the test.

This proprietary material is a practically 100 per cent pure hydrocarbon compound which, when used in very small amounts in molding sands, serves as a facing material. It is completely soluble in carbon tetrachloride and benzol. A 10-g sample of sand is boiled in a 50-50 solution of carbon tetrachloride and benzol for eight to ten minutes. The mixture is filtered immediately. The filtrate is evaporated to dryness—caution being exercised to remove the beaker as the last drop of liquid is being evaporated. Upon cooling, the beaker is reweighed and the added weight is the amount of hydrocarbon present, usually in a fraction of a gram. This weight multiplied by 10 yields actual per cent of material in the sand.

Up to 20 samples of continuous unit sand are tested during a seven-hour period. Samples are checked for moisture, permeability, and green compression. A graph record, such as shown in Fig. 6 is kept current and is posted near the muller operator. As is noted, control limits have been established for moisture, permeability and green compression. The remarkable moisture control is due to metered water additions plus good judgment on the operator's part. Clay, sieve, and dry compression tests are run twice weekly, except if need requires otherwise. Combustible and special hydrocarbon tests are run once daily. The unit system, portions of which is shown in Fig. 7, serves 12 molders.

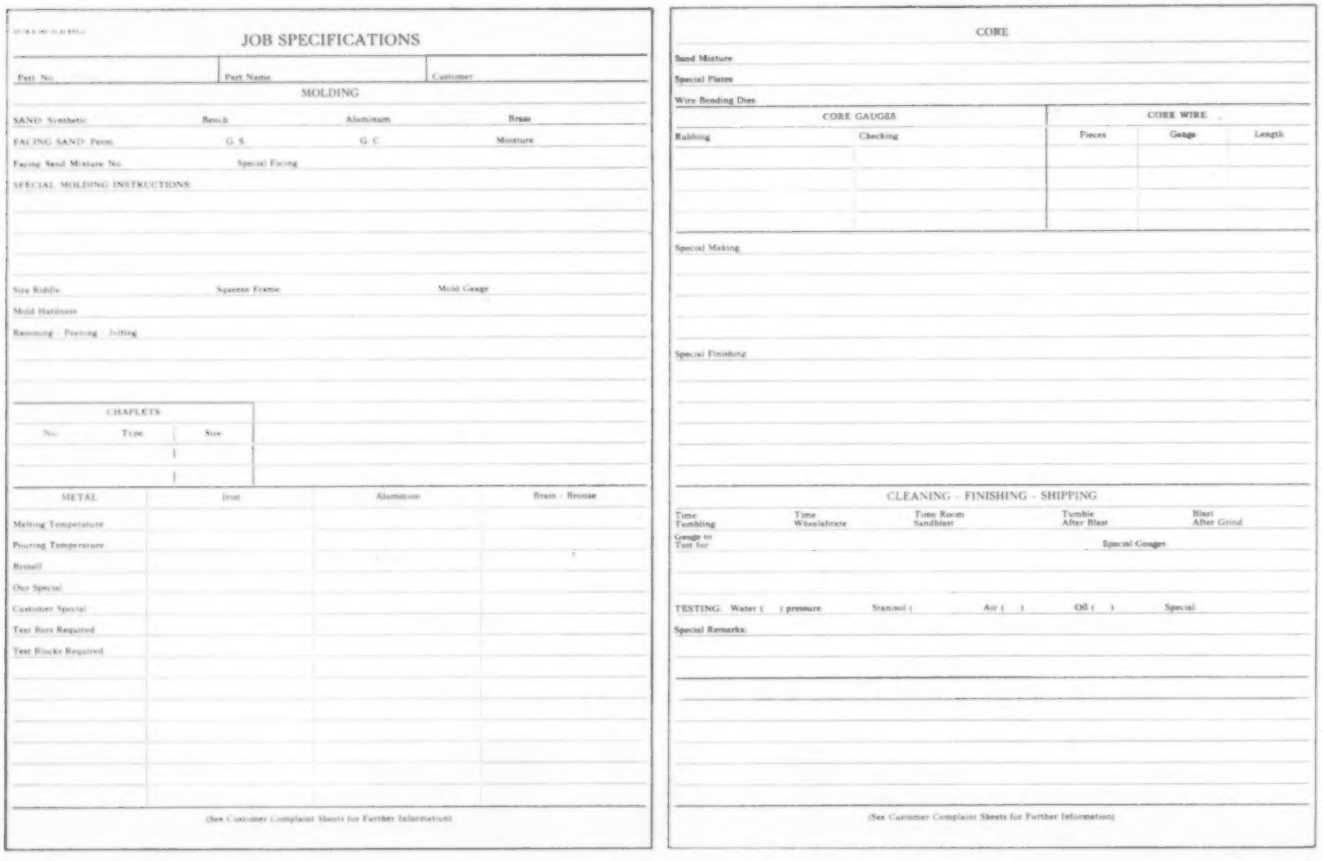
Maintain Control Checks

Heap sands are checked for moisture, permeability and green compression every other day. Daily checking was eliminated after establishing a "water volume addition—poured metal weight" formula. Tests indicated sand reconditioning and retempering practices were quite uniform, and checking every other day would keep the foundry reasonably free of trouble. Clay, grain and combustible checks are not made on definite schedules, but are run when green compression and permeability tend to wander towards the limits of set allowable variation. As with checks on incoming sands, permanent records are made of the sands tested. The form in Fig. 1 is used for this particular purpose also.

Facing sands are set up by numbers and are spot checked for moisture, green compression and permeability when run. Here again, more complete testing is not resorted to unless variation from previcus results is noted in the more basic tests.

In a sense, in the core department, it is true that raw sand testing gives the key to expected results from the sand, and no other laboratory test is necessary. Particular reference is made to sieve and clay testing. However, a rule of thumb check is used in the core department as a final test. With use of sand from a new car, several small ½ x 3-in. diameter disks are prepared and baked in the regular core ovens and are finger-rubbed and broken to catch any unusual variations. Such variations could arise from poor application of binders and baking; and it is possible a recheck on the lab sand report may be called for.

In establishing procedures, past records are essential. Each establishment should base, at least its starting procedures, on its previous written experience and proceed to improve such procedures through experimentation, foundry literature and technical assistance. Controlled, desirable quality is the best way to keep foundry products in a strong competitive position.



JOB SPECIFICATIONS

Part No. | Part Name | Customer

MOLDING

SAND: Synthetic | Bench | Aluminum | Brass

FACING SAND: Perm. | G.S. | G.C. | Moisture

Facing Sand Mixture No. | Special Facing

SPECIAL MOLDING INSTRUCTIONS

Size Riddle | Squeeze Frame | Mold Gauge

Mold Hardness

Ramming - Pressing - Jolting

CHAPLETS

No. | Type | Size

METAL	Iron	Aluminum	Brass - Bronze
Melting Temperature			
Pouring Temperature			
Brinell			
Our Special			
Customer Special			
Test Bars Required			
Test Blocks Required			

(See Customer Complaint Sheets for Further Information)

CORE

Sand Mixture

Special Plates

Wire Bending Dies

CORE GAUGES: Rubbing | Checking

CORE WIRE: Pieces | Gauge | Length

Special Making

Special Finishing

CLEANING - FINISHING - SHIPPING

Time Tumbling | Time Wheelabrate | Time Room Sandblast | Tumble After Blast | Blast After Grind

Gauge to Test for | Special Gauges

TESTING: Water ( ) pressure | Stanisol ( ) | Air ( ) | Oil ( ) | Special

Special Remarks:

(See Customer Complaint Sheets for Further Information)

Front and back of 8½ x 11 in. *Job Specifications* card, which is filled out for each job entering the foundry

MOLYBDENUM IN THE FOUNDRY....

ROLLS are among many cast and wrought iron and steel products that have been improved by Molybdenum. Very small additions, rightly introduced, yield surprising results. In the case of mill rolls, Molybdenum makes the difference between a reasonably good roll and one that is stronger and and tougher, and especially better adapted for operating at high temperatures.

This is only one of many uses that Molybdenum serves to the betterment of foundry products. Its most valued effects are to strengthen and toughen—especially to improve high-temperature strength and uniformity of strength in both light and heavy sections. Foundry practice need not be altered at all when Molybdenum is added to any iron or steel composition.

The Molybdenum Corporation has a special pamphlet on the foundry uses of Molybdenum. As a supplier of Molybdenum, Tungsten, and other alloying materials, the Corporation welcomes the inquiries of any user.

MASTER CRAFT ALLOYS

AMERICAN Production, American Distribution, American Control, Completely Integrated.
Offices: Pittsburgh, New York, Chicago, Cleveland, Detroit, Los Angeles, San Francisco, Seattle.
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Subsidiaries: Cleveland-Tungsten, Inc., Cleveland, O.; General Tungsten Manufacturing Co., Inc., Union City, N. J.
Works: Washington, Pa.; York, Pa.
Mines: Questa, New Mexico; Urad, Colorado.

MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

Foundry Developments

By EDWIN BREMER

PRECISION casting of gas turbine diaphragms with marked advantages of economy, quality and simplicity now can be accomplished by a composite method, according to a report issued by the Office of Technical Services, Department of Commerce, Washington 25. The composite method involves the use of a core made by the investment process for the critical dimensions of the throat area while the outer contours are generated by a conventional dry sand core into which the investment core is set just before pouring. The report PB-31210 Part I "Experimental Production of Pilot Static and Centrifugal Castings for the Armed Services," Part II "Precision Casting of Gas Turbine Diaphragms" (microfilm $2; photostat $4) also describes the core assembly and investment molding procedures which were tried for production of the diaphragms.

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COMBINATIONS of glycerine and litharge with or without other additions have found numerous uses as cements or binding agents for many materials according to *Glycerine Facts* issued by the Glycerine Producers' Association, New York. Novel, however, is the use of these materials as binders for metal-containing plastic compositions. According to U. S. Patent No. 2,406,428 these compositions provide dense homogeneous masses which possess considerable strength and are highly useful for many applications such as the production of jigs, forming dies, book ends, lighting fixtures, etc. Possibly it might serve for making hard matches, etc. Proportions of the binding materials may be varied, but best results are obtained by employing 50 per cent litharge and about 15 per cent of glycerine by weight. Following combination is given as best from standpoint of density and resistance to crushing: Litharge 57.1 per cent, iron dust 21.4 per cent, iron filings 7.3 per cent, and glycerine 14.2 per cent. Metal and litharge are mixed thoroughly followed by addition of glycerine and mixing again. Resulting dough is sufficiently workable to take mold shape without employing pressure. It is allowed to stand at room temperature until fully set. Composition need not be molded, but can be prepared in a form suitable for working with tools employed on cast iron, steels, etc.

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DEVELOPMENT of an electronic x-ray counter that accurately records x-rays at a millionth of a second speed over a wide range of intensities has been announced by Dr. Fitz-Hugh Marshall and Dr. John W. Coltman, Westinghouse research engineers. Reported to be the first all-purpose tool for the measurement of x-radiation, this detector in high speed tests has approached the ultimate in sensitivity by providing exact measurement of the smallest x-ray units known, as well as intense radiation. Device employs a photomultiplier electronic tube wrapped in a sheet of fluorescent screen, and the whole wrapped in black paper. While the latter blocks out room light, x-rays penetrate to the fluorescent screen. The tube responds to the intensity of the fluorescence and amplifies that response one million times.

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SURVEY of manufacturers of planes, power plants, propellers and accessories, and of airlines operators by the Aeronautical Drafting Committee, SAE, discloses that 80 per cent now employs decimal dimensioning or contemplates its early adoption. Users explain that the practice of expressing limited measurements in decimals rather than fractions of inches contributes to speed and to accuracy in both design and in manufacture. Decimals are carried to two, three, or more places to satisfy varying tolerance requirements. Practice eliminates the time-consuming error-producing operations of converting decimals to fractions and back to fractions again.

• • •

PROCESS developed by Upton Electric Furnace Division, Detroit, makes use of the natural chemistry of a high temperature salt bath to cause the electrodes which normally are wasted away during the operation to renew or self-perpetuate themselves. Usually two electrodes are located in a slot or pocket in the bottom of the furnace. Immediately above each electrode on each side of the pot is a ledge or overhang of refractory material under which a graphite rod is placed. Oxides in the bath make contact with the graphite rod and are reduced to a metallic scale which is deposited on the rod. Contact with the graphite rod increases the carbon content of the metallic scale, reducing its melting point so that it falls out of contact with the carbon of the rod, from the rod onto the electrodes. There the oxides of the bath reduce the carbon content of the metallic scale whereupon it becomes a solid, integral part of the electrode. Process is said to continue automatically until the graphite rod is consumed, when a new rod is inserted under the ledge.

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NEW BOX furnaces to meet modern laboratory requirements for high, automatically controlled temperatures has been placed on the market by General Electric Co. Suitable for operation up to 3100 F, the furnace can be used for melting and bright annealing of metals, reduction of metallic oxides, sintering powdered metals, brazing, etc. Since heating units must be protected against oxidation the furnace is limited to operations which can be performed in a protective atmosphere. Heating units are rated at 20 kw, 65 v, single phase, at 3100 F. They are molybdenum rods formed into sinuous loops supported inside the heating chamber, which is 4 in. wide, 4½ in. high, and 25 in. long and lined with refractory brick backed by heat insulation. Water-jacketed cooling chamber permits materials to be cooled in protective atmosphere. Automatic temperature control is provided by standard type temperature control instrument mounted on operator's panel.

• • •

IN A highly technical article in the January issue of the *Journal* of the Institute of Metals, F. Roehner develops a new theory of age hardening of aluminum-copper alloys which is claimed to explain more experimental facts than the precipitation and dispersion theories. Based on the electron theory of metals the author proposes that increases and decreases in strength and electrical resistivity are due to the formation of vacant lattice sites and vacant lattice regions. The vacant lattice site is due to the dissociation of the solute ion from its lattice space, resulting in an ion in the interstitial lattice space and vacant lattice site. Both dissociation products, the negative site and the positive ion, are capable of diffusion and both can be rejected from the lattice. Rejection or discharge of a vacant site results in the transformation to a vacant region.

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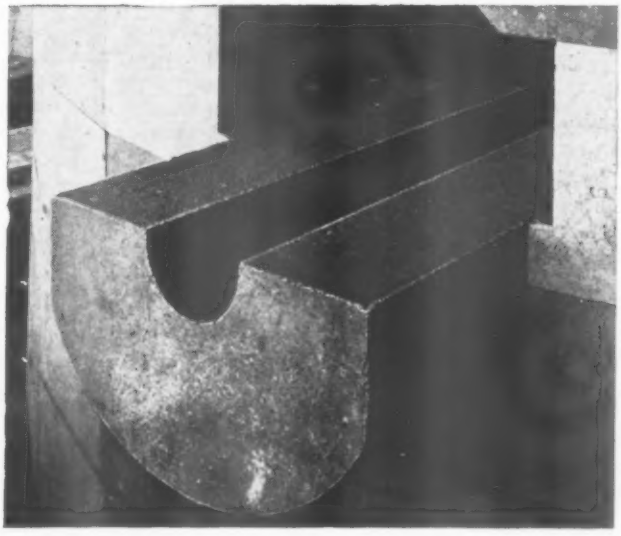

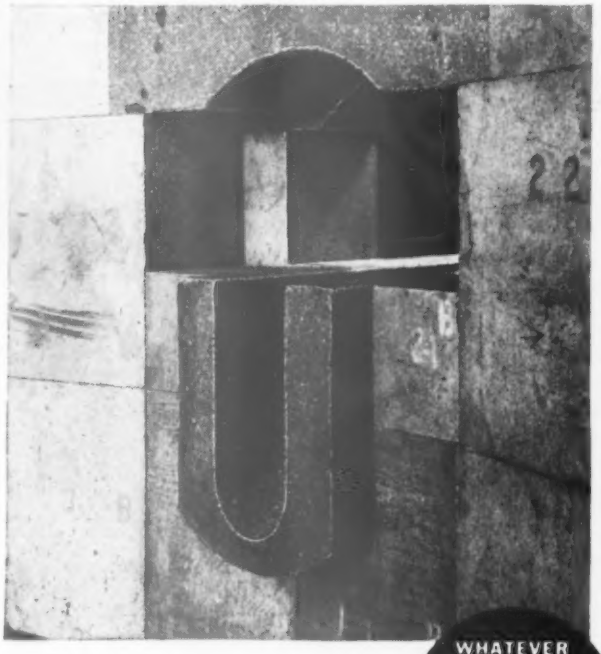

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BIRMINGHAM FOUNDRYMEN

Hold 15th Annual Conference

By WILLIAM G. GUDE
Managing Editor
THE FOUNDRY

BIRMINGHAM District Chapter of the American Foundrymen's Association attracted approximately 500 southern foundrymen, Feb. 20-21, to another of the highly successful conferences which the group has been conducting since 1931. Program of this 15th Annual Foundry Practice Conference, held at the Tutwiler Hotel, Birmingham, included two full days of technical papers and plant visitations in addition to two luncheon meetings, entertainment and the annual banquet—all under the capable direction of Chapter Chairman Tom H. Benners Jr., T. H. Benners & Co., the program committee headed by Vice Chairman W. E. Jones, Stockham Pipe Fittings Co., plus the other chapter officers, directors and committeemen.

Both AFA National President S. V. Wood, president, Minneapolis Electric Steel Castings Co., Minneapolis, and William W. Maloney, national AFA secretary, attended the conference, the former being the principal speaker at a luncheon Thursday, presided over by Vice Chairman W. E. Jones. In an inspirational talk, Mr. Wood emphasized the importance of having all branches of the foundry industry produce quality products, since inferior castings of any one type tend to discredit cast materials as a whole. He also recommended the development of an enthusiasm for foundry work, adding that those who do not have that enthusiasm would be better off if they left the industry. He urged foundries to pay more attention to the quality of their supervisory staffs and not to select supervisors merely on the basis of seniority.

Mr. Wood also spoke at a Friday noon luncheon at which managerial representatives of Birmingham district foundries were guests. He explained the general functions of the AFA and described various of the benefits accruing to both individual companies and the industry from the association's work. Mr. Maloney, who also spoke at this luncheon, gave additional details on the AFA organization and the activities of both the national body and its 36 chapters.

An enjoyable entertainment program was offered conference visitors Thursday evening by the chapter's entertainment committee, headed by J. M. Bates, Moore-Handley Hardware Co. A complete floor show was followed by the showing of a film of the Georgia vs North Carolina Sugar Bowl football game.

Another feature of the conference was the Friday morning open-house at various Birmingham foundries. Plant visitations were arranged by Joe T. Gilbert, Stockham Pipe Fittings Co., and John G. Wakeland, Alabama Foundry Co.

The annual banquet Friday evening concluding the conference was presided over by Chairman Benners, with James W. Moore, American Cast Iron Pipe Co., doing an outstanding job as toastmaster. Guest speaker was Dr. J. L. Brakefield, secretary, Industrial Development Division, Birmingham Chamber of Commerce. An excellent speaker, Dr. Brakefield's talk, entitled "Current Trends," contained a strong plea for the rejection of all "isms" which tend to impair or destroy the liberties of individual Americans.

A comprehensive review of core blowing practice and equipment was given at the opening technical session Thursday morning by Lawrence D. Pridmore, International Molding Machine Co., Chicago. J. E. Getzen, sales engineer, H. G. Mouat Co., was chairman of the meeting. Mr. Pridmore described the early history of core blowing machines, tracing the development up to the present with slides showing a wide variety of equipment for producing numerous types and sizes of cores. The speaker stated that adaptation of the blowing method also to the production of molds is definitely on the way and predicted that equipment for this purpose will find ap-

(*Continued on page* 159)

(All conference photos by John C. Graham Jr., Stockham Pipe Fittings Co.)

Some of the participants in the Birmingham Foundry Practice Conference. Shown left to right are Dr. J. L. Brakefield, Birmingham Chamber of Commerce, banquet speaker; Tom H. Benners Jr., T. H. Benners & Co., chapter chairman; Fred G. Sefing, International Nickel Co., New York; W. B. McFerrin, Electro Metallurgical Co., Detroit; John P. Sellas, Michigan Steel Casting Co., Detroit; L. D. Pridmore, International Molding Machine Co., Chicago; W. E. Jones, Stockham Pipe Fittings Co., chapter vice chairman; W. W. Maloney, national AFA secretary; Tom G. Johnston, Republic Steel Corp., Cleveland; L. N. Shannon, Stockham Pipe Fittings Co., former AFA national president; S. V. Wood, Minneapolis Electric Steel Castings Co., national AFA president

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(*Continued from page* 156)

plication not only for long-run work but also in jobbing shops which must make frequent pattern changes.

Mr. Pridmore discussed the different types of corebox vents—slotted, hole and screen types—explaining that the first two are preferred for locations where metal impinges against the core when the mold is poured. Blowholes should be ⅝ or ¾ in. rather than smaller diameter; small openings cause high velocity of the introduced sand and increase corebox wear.

At the second technical session John P. Sellas, sales manager, Precision Castings Division, Michigan Steel Casting Co., Detroit, described in detail the practice of that company in the manufacture of small alloy steel castings by the investment process. J. A. Bowers, superintendent of melting, American Cast Iron Pipe Co., presided at the session. Michigan Steel Casting Co. forms its expendable wax patterns in dies cast from a tin-bismuth alloy, which is poured into a square gray iron framework at 400-450 F. The outer iron section provides the necessary rigidity to prevent distortion of the die in subsequent handling. Allowance of 0.018 in. per in. is made in the pattern cavity to compensate for shrinkage of the wax after injection and the metal after pouring. Tolerances attained on the castings themselves are plus or minus 0.003 to 0.005 in.

Wax employed is a combination of 80 per cent pure vegetable wax and 20 per cent plastic material. The latter adds strength to the solidified pattern and minimizes danger of distortion in later assembling and molding operations. In fact, the pattern will break before becoming permanently distorted.

The air-operated wax casting machine, the company's own design, is manipulated easily, one handle actuating the clamping and injection of the die. Air pressure and speed of injection can be adjusted. The die is given a light spray consisting of a mixture of hand soap and water before injection, in order to assist removal of the pattern, since provision is not made for draft. With patterns involving difficult draw the operation is facilitated by using a die which has first been chilled by immersion in dry ice.

Assemble the Patterns

The wax is injected at a temperature of 145 F and solidifies with sufficient rapidity that the operator can open one die and remove the pattern while another set is being injected. Individual patterns next are assembled with runners to a common wax gate, the number of patterns used depending on how many can be accommodated in the flask. The finished assembly then is given a coating of fine silica flour applied in the form of a colloidal solution. This is allowed to harden overnight and a second wash is applied, followed by a coarser coating of 50 mesh silica sand.

The flask employed is simply a cylinder made of heat-resistant steel to the top of which is affixed an extension consisting of several inches of paper. It is placed over the pattern assembly after the latter first has been mounted on a plate corresponding to the bottom board in ordinary sand casting practice. Investment material is carefully ladled into the flask and the mold then placed on a vibrating machine for 20 minutes. This vibration removes any voids in the mold and permits fines to rise to the paper rim, which subsequently is cut off. The bottom plate also is removed and the mold is ready for the pattern removal. This is accomplished in a low temperature oven where the mold is heated during an eight-hour cycle at 150 to 210 F. The melted wax drops onto trays and is later removed, strained and reused. About 90 to 95 per cent of the wax is reclaimed.

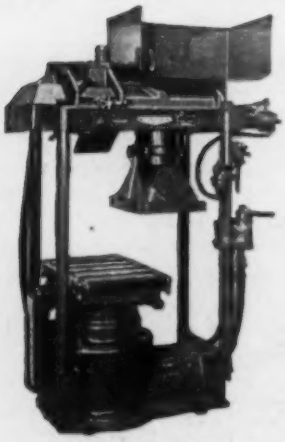
Prior to pouring the molds they are baked in a preheat oven at 1600 to 1800 F and are poured while hot, only about 15 seconds elapsing between their removal from the oven and actual pouring. Melting units are six indirect arc furnaces of 6½ lb capacity. Operating on a cycle varying from 8 to 16 minutes each furnace is charged with the required amount of metal shot to fill one mold. This metal is prepared to the desired composition in an induction furnace and then made into shot form. Metal is principally stainless steel.

When the casting furnace heat is ready the mold is clamped to the top; both are then inverted and the metal runs into the mold by gravity, assisted also by air pressure of 6 to 8 lb which is introduced by a line through the furnace trunnion. This air pressure is estimated to be equivalent to what would be provided by a 14 in. riser. Pouring temperature is 2900 to 3150 F.

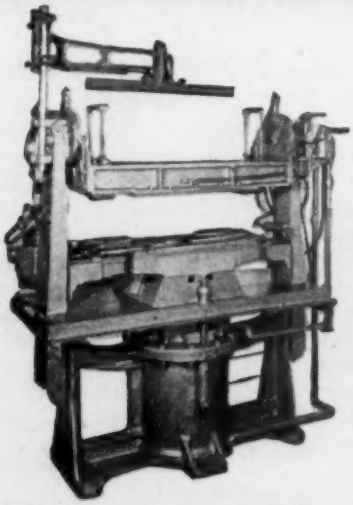
A pneumatic hammer is required to break up the mold and permit removal of the solidified casting for subsequent cleaning and removal of gates and run-

(*Continued on page* 280)

Scenes at the annual banquet concluding the Birmingham conference. Attendance totaled approximately 500



#193 Osborn Blower, draw piston type



#333 Osborn Jolt-Squeeze Rollover

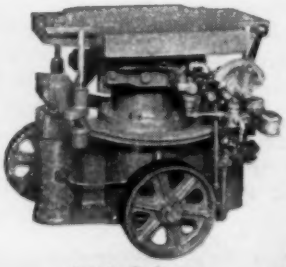
#94 Osborn Core Blower

#442 line Jolt Rockover Machine

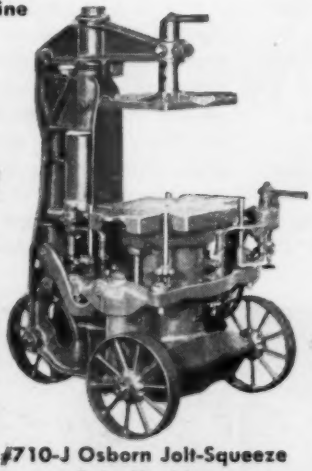
#146 Osborn Core Box Drawing Machine

#405 Osborn Jolt Rollover

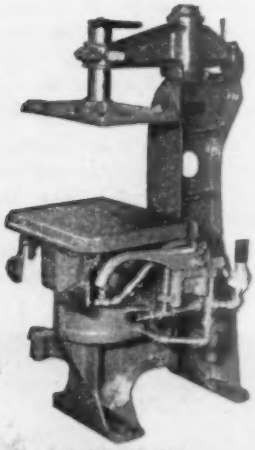
#539 Osborn Jolt Strip Machine



#559 Osborn Jolt Strip Machine

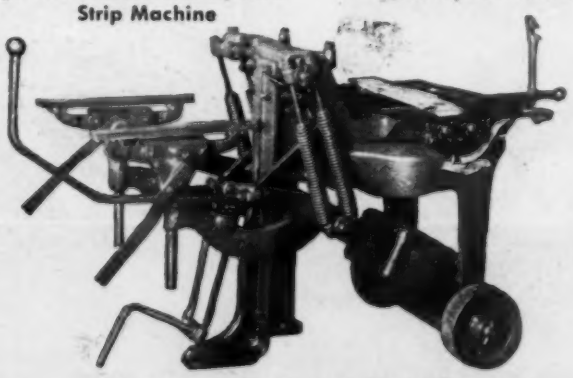


#710-J Osborn Jolt-Squeeze Strip Machine



#210-PJ Osborn Jolt Squeeze Machine

#413 Osborn Jolt Rollover



#42 Osborn Hand-Operated Rockover Core Machine

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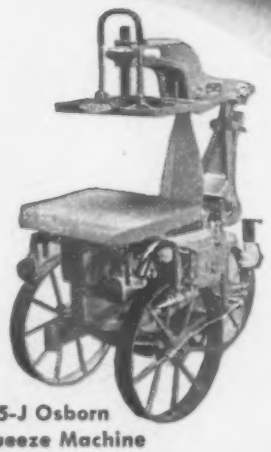
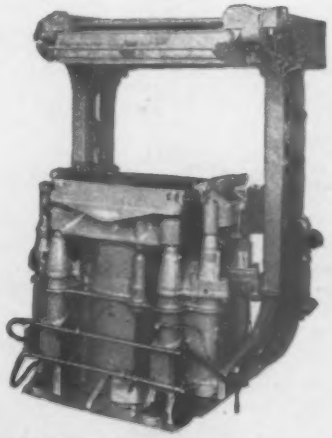
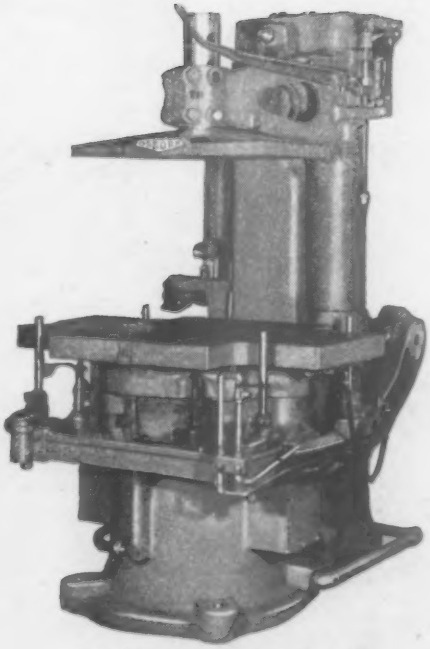


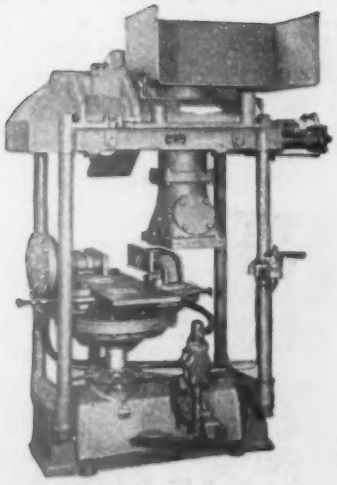
#275-J Osborn
Jolt-Squeeze Machine



#1024 Osborn Jolt-Squeeze
Strip Machine



#724-PJ Osborn Jolt Squeeze
Strip Machine



#93 Osborn Core Blower

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WISCONSIN CONFERENCE

Provides Interesting Program

By EDWIN BREMER, WILLIAM G. GUDE, ERLE F. ROSS and GEORGE A. POPE
The Foundry

AN INTERESTING and well diversified program of technical papers, discussions and general addresses marked the tenth annual regional foundry conference, Feb. 13-14, sponsored by the Wisconsin chapter of the American Foundrymen's Association and the University of Wisconsin. Attendance, as is usual at these meetings, was heavy, with nearly 550 foundrymen registered and more than 630 in attendance at the banquet. Program for the conference, which was held at the Hotel Schroeder, Milwaukee, included 24 technical sessions, two general meetings, two luncheon meetings, and the banquet.

David C. Zuege, Sivyer Steel Castings Co., Wisconsin Chapter chairman, presided at the opening session Thursday morning at which Dean M. O. Withey, College of Engineering, University of Wisconsin, presented the opening address. Dean Withey discussed the problems of engineering schools in attempting to cope with the heavy student registration, and pointed out that the United States made inadequate provision for the training of such students during the war which is resulting in the present situation. He said it is hard to tell when supply of engineering graduates will meet the demand but that the shortage probably will extend through 1948 and maybe into 1950. At present there are 154,000 returned war veterans enrolled in engineering schools. The shortage of instructors also is a problem and Dean Withey expressed the hope that industry can assist in this respect through furnishing part time lecturers.

The principal talk at this general meeting was given by James Thomson, Continental Foundry & Machine Co., East Chicago, Ind., on the subject of "Good Housekeeping." John Bing, A. P. Green Fire Brick Co., Milwaukee, presided as technical chairman. Mr. Thomson's discussion of the importance of good housekeeping in the foundry was presented in full in the February issue of THE FOUNDRY.

R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis., and general chairman of the conference, presided at the Thursday luncheon meeting. Speaker was Carl Taylor, president, Waukesha State Bank, Waukesha, Wis., who made a strong plea for the return of power to the people and away from the governmental bureaus. He said that the main problem is to get the great mass of people to understand that private enterprise is the secret of their country's success and once they have learned it to seek to preserve it.

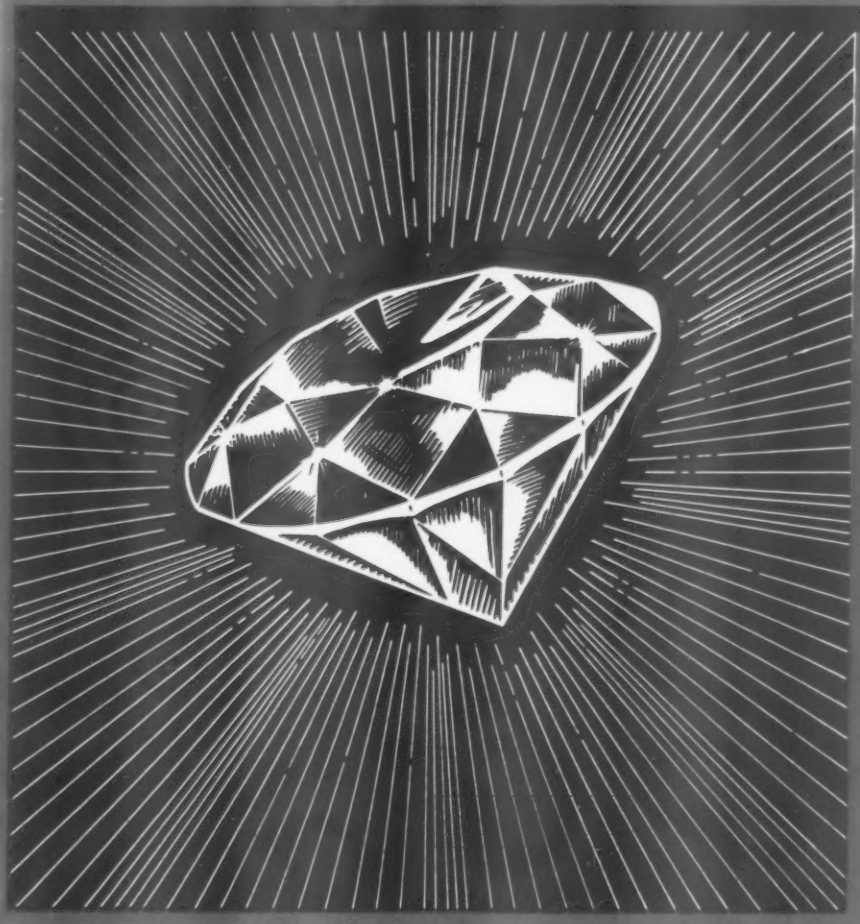
Speaking at the annual banquet, Dr. A. E. Kahn, Ripon College, Ripon, Wis., discussed "Economic Forces for World Peace." He stated that wars are caused by friction between nations, the principal one of which is economic conflict. These can be settled, he pointed out, but political conflicts cannot. Disruption of economic trade set the stage for World War II because liberty loses its attractiveness under conditions of want, he stated. Dr. Kahn listed the following requirements for world peace:

1. Reconstruction is needed first, to rebuild economy.
2. Continuous supply of capital, with less disparity between living standards of various countries. We can't change ideologies except by building up democratic governments which can promote stable economy and provide jobs.
3. Orderly currency relationships.
4. Reduction of trade barriers. Other countries are afraid of another American depression, they are afraid of our conservative temper and they are afraid we do not intend to lower tariffs which will

(*Continued on page* 164)

General view of the banquet held during the Regional Foundry Conference in Milwaukee

Smooth facing, in diamonds or castings, depends upon the purity of the carbon



Diamonds and CROWN HILL SEACOAL are both carbon, but imperfections in either will spoil facings. CROWN HILL is made from the finest coal; imperfections are reduced to the absolute minimum. CROWN HILL contains the merest trace of sulphur; it ignites instantly, and combustion is practically complete. The use of this quality seacoal facing brings smoother castings, reduces cleaning costs, and improves quality. The old adage still goes with CROWN HILL SEACOAL FACING: it's hard to beat a good product.

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(*Continued from page* 162)
permit more international trade.

Sheldon V. Wood, president, American Foundrymen's Association, also addressed the banquet meeting. In his usual interesting manner, Mr. Wood stressed the importance of developing an enthusiasm towards foundry work. He also emphasized the need of taking an inventory of manpower. Labor represents up to 70 per cent of total cost but industry gives it less attention than it does to materials. Mr. Wood urged that seniority not be used as the sole basis in promoting men.

LeRoy E. Luberg, assistant to the president, University of Wisconsin, spoke at the Friday noon luncheon meeting and gave an interesting discussion of the Far East situation based on his experiences while located in China during the war.

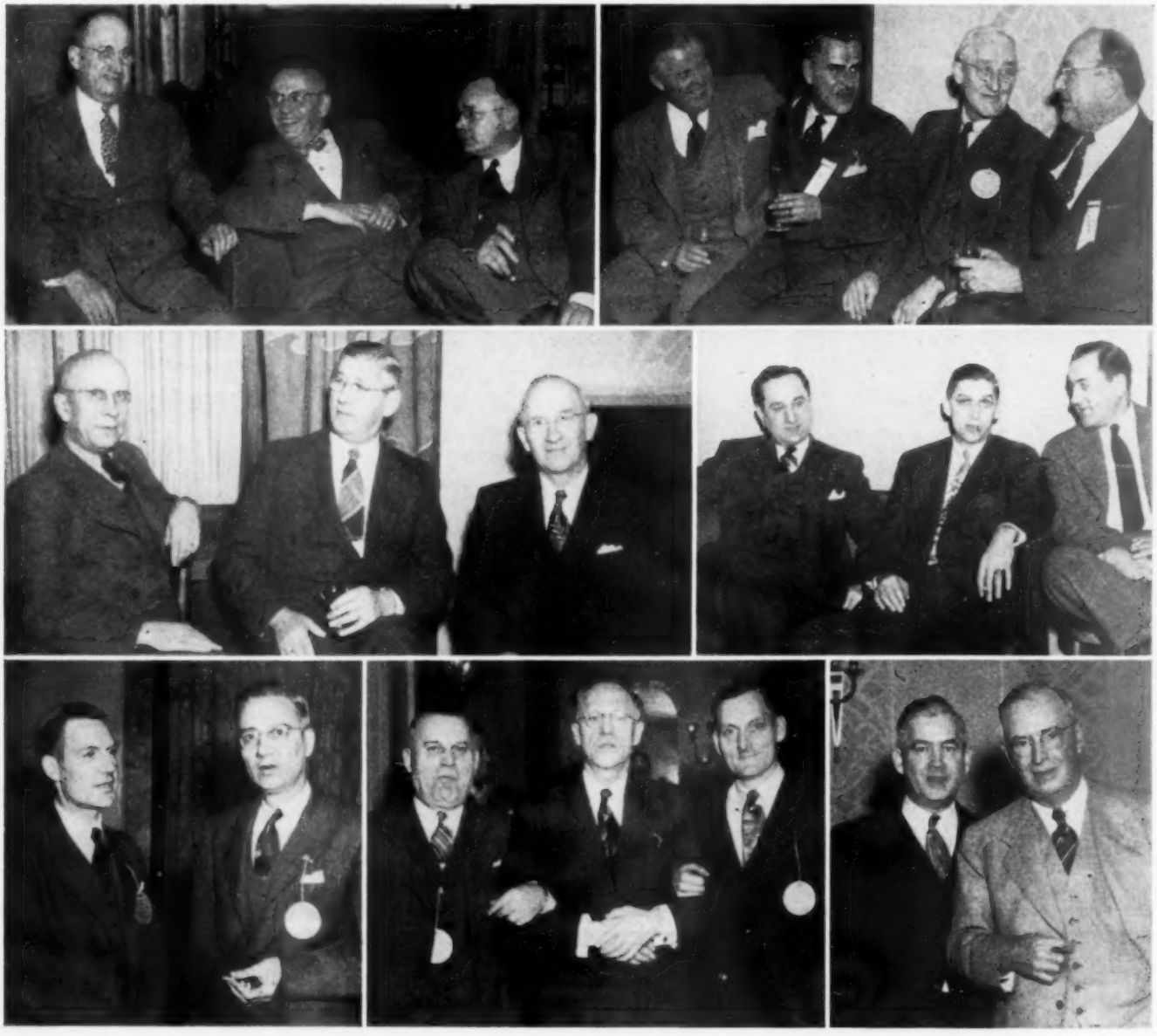
At the last general meeting concluding the conference, Frank G. Steinebach, editor, THE FOUNDRY, Cleveland, discussed "Recent Progress in the Foundry Industry," outlining developments of the last few years and requirements for the industry's future success.

First technical session on gray iron was held Thursday afternoon with J. V. Olle, Motor Castings Co., presiding. Discussion leaders were O. Jay Meyers, Foundry Research Laboratory, Werner G. Smith Co. Division, Archer-Daniels-Midland Co., Minneapolis, who spoke on core sand testing, and Victor Rowell, Velsicol Corp., Chicago, who described sand core properties. Mr. Myers pointed out that the fundamental purpose of testing foundry core sand mixtures is to reduce scrap through diligent control. Mere insertion of technical data from the tests on neatly printed forms has no value unless they are interpreted properly, evaluated and correlated with foundry production.

Most important physical characteristics of a core sand mixture in the green state are moisture percentage and green bond. Moisture may be determined by drying the sand in a blast of hot air or by a chemical reaction with calcium carbide which forms a measurable gas pressure. In the former air temperature should not be over 325 F with oil-bearing mixtures since evaporation, polymerization and oxidation of the oils may occur. Also the time of testing should not be over three minutes due to a possible loss of other constituents than water.

Purpose of water in a green core sand mixture is to control the green strength which it does through its surface tension in a mixture composed solely of sand and core oil. Where moisture absorbers

(*Continued on page* 168)

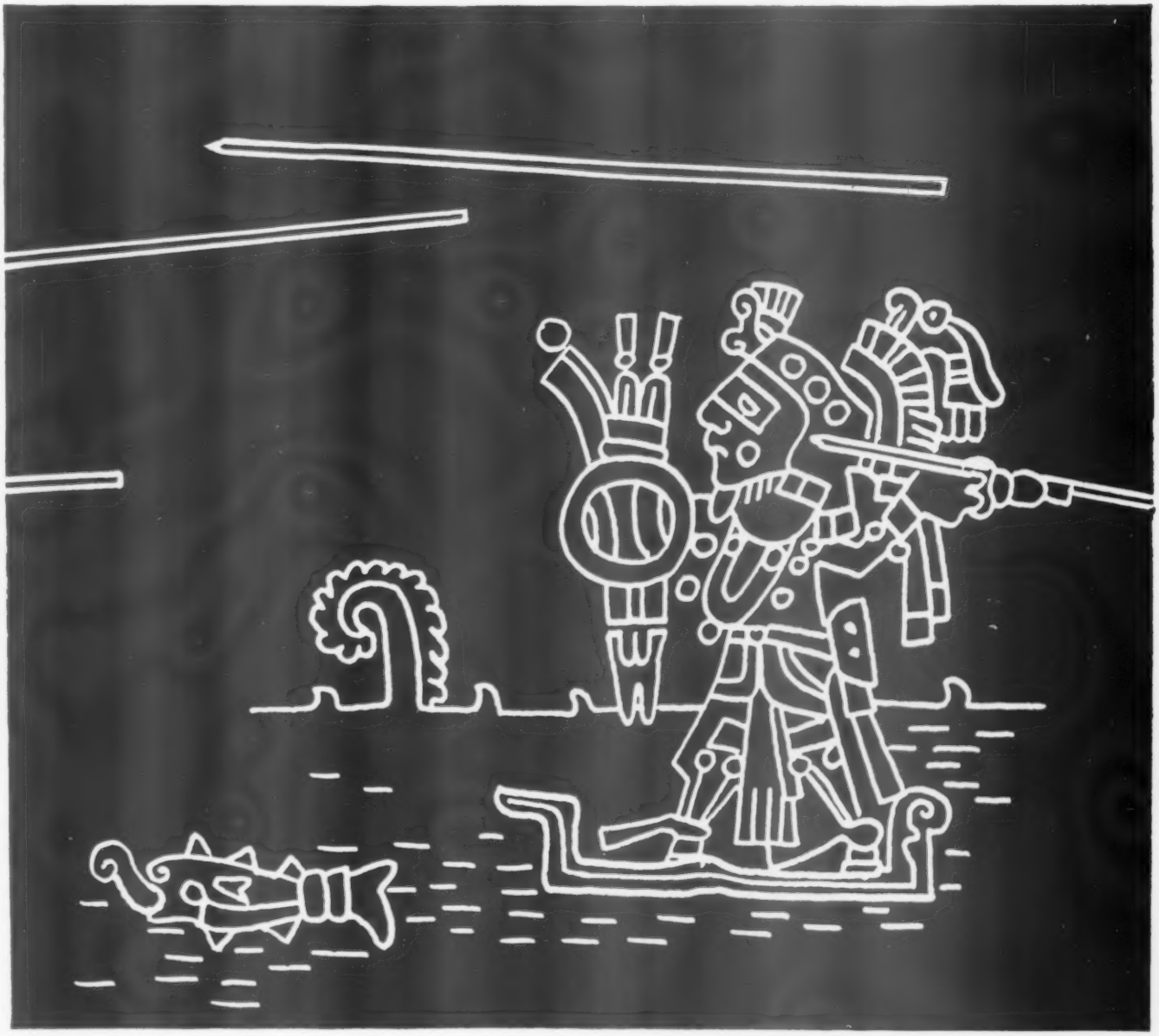


Some of the speakers, chairmen and other participants in the Wisconsin foundry conference, Feb. 14-15. Conference photos are by courtesy of John Bing, A. P. Green Fire Brick Co., Milwaukee

HOW TO MAKE AN ARM GROW

A human arm can throw a spear only so far. But some ancient genius of an engineer figured out that, by employing a throwing stick, which the Aztecs called *atlatl,* the lever of the human arm —and the distance achieved—could be extended, with quite pointed results for an enemy.

Specifying molybdenum in cast steel is something like using an *atlatl.* By providing good hardenability, and minimizing temper brittleness, molybdenum extends the usefulness of good cast steel. Furthermore, molybdenum improves foundry production economy for several reasons worth investigating.



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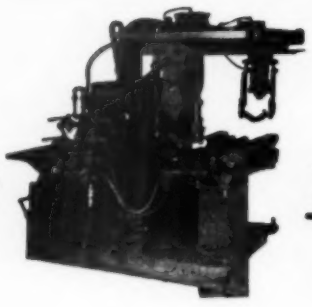
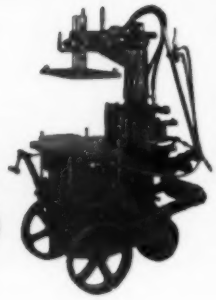
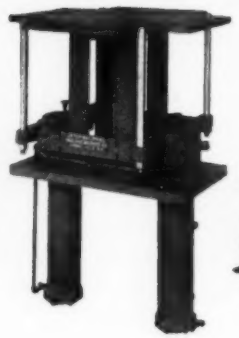
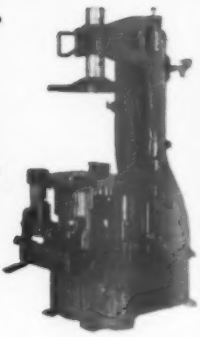
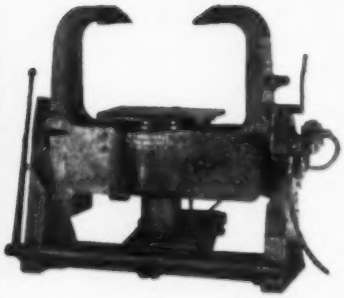
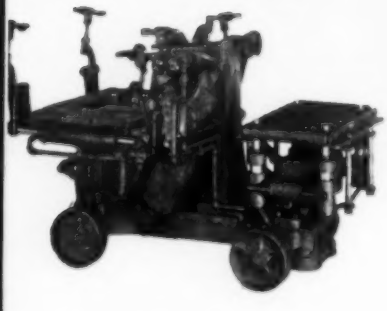
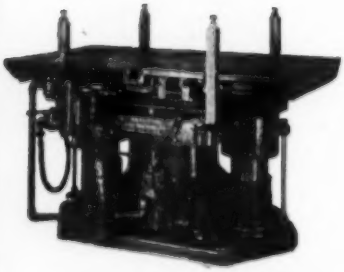


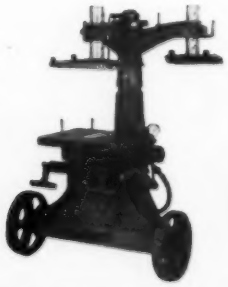
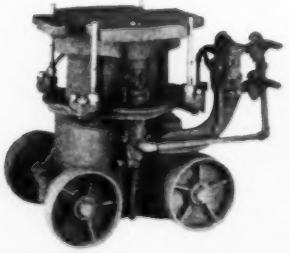
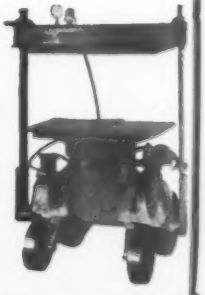




INTERNATIONAL MOLDING MACHINES

For Castings



Foundries in which MAXIMUM PRODUCTIONS are maintained continuously are equipped with

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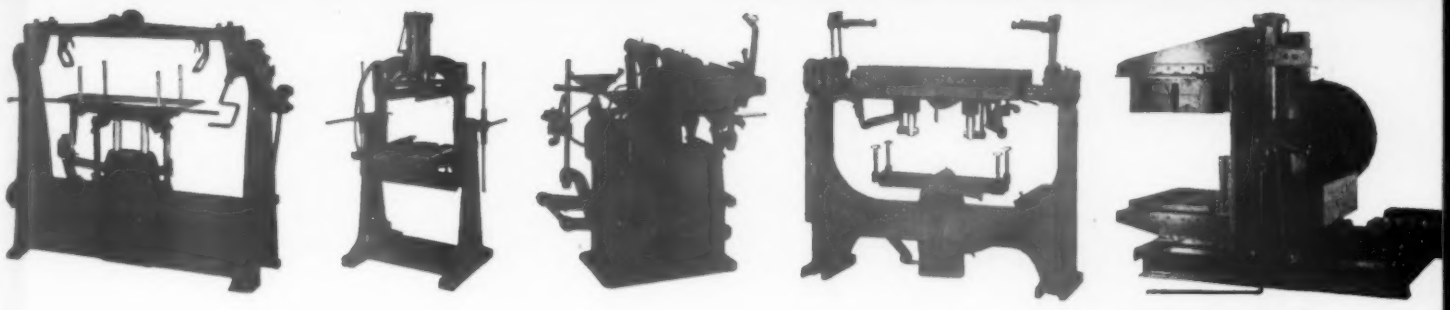
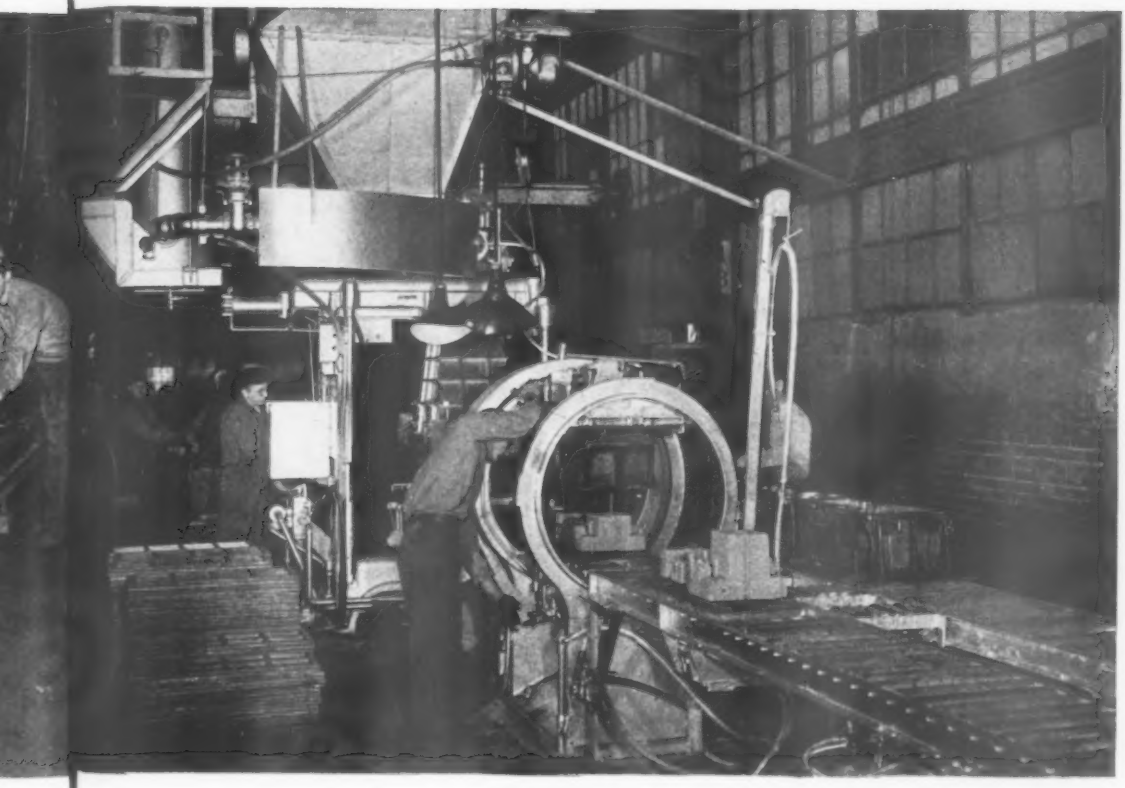
70 Standard Types - - - 900 Different Sizes

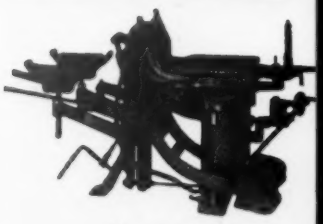
Many Special Designs to meet Special Requirements

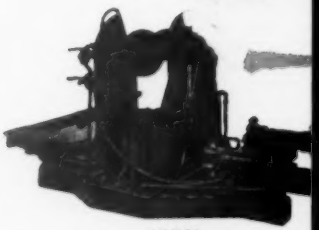


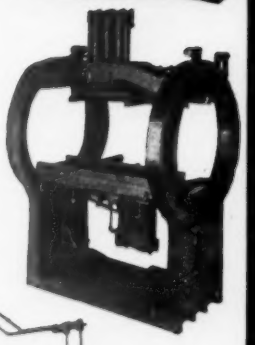
INTERNATIONAL MOLDING MACHINES

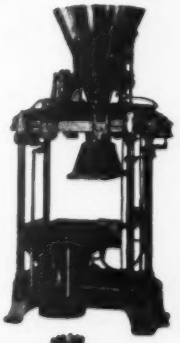
For Cores











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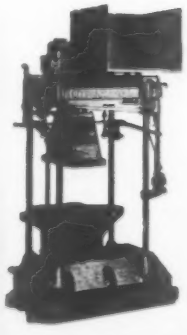
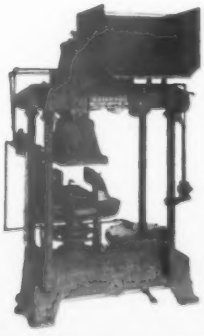
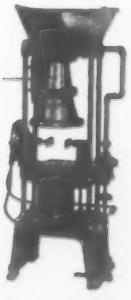
NOW LOCATED IN OUR NEW PLANT

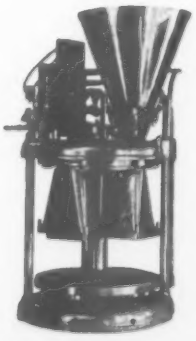
LA GRANGE PARK, ILLINOIS

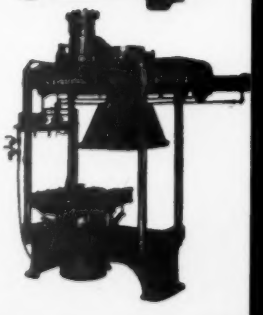
(CHICAGO SUBURB)











PAST PRESIDENTS: This view of past presidents of the Wisconsin Chapter, AFA, taken at the Wisconsin Regional Foundry Conference, includes: Back row, left to right—B. D. Claffey, General Malleable Co., Roy M. Jacobs, Standard Brass Mfg. Co.; H. E. Ladwig, Allis-Chalmers Mfg. Co.; John Bing, A. P. Green Fire Brick Co. Front row—W. F. Bornfleth, Cutler-Hammer Mfg. Co.; Walter Gerlinger, Walter Gerlinger Inc.

(*Continued from page* 164)

such as cereal or clay are used for green strength, use of water is imperative. Optimum green bond for any core mixture occurs over a very narrow range of moisture. There is a direct interfunction between stickiness of a core to the pattern and the amount of green bond in a cereal bonded core mixture.

Water in a core sand mixture predetermines the strength of a core after baking. Excess water causes a loss of tensile strength due probably to producing a discontinuous linseed oil film around the individual sand grain. For cereal-core oil-sand mixtures a green bond strength between 1 and 1.5 psi is recommended to reduce stickiness. Permeability of the baked core sand mixture is controlled to a certain extent by the amount of moisture since in the green state it holds the sand grains apart, leaving voids after baking.

While the green bond of a core sand mixture is affected by the moisture, the potential green strength is a function of the original grain size of the base sand. For example, a fine grain sand (AFA No. 140) combined with high moisture (7-8 per cent) can be made to produce as high a green bond as a core sand (AFA No. 50) to which both cereal (1 per cent) and water (2 per cent) have been added. For testing of green bond strength Mr. Myers prefers the Saeger green compression tester.

Since 95 per cent of a core sand mixture is the base sand, it should be controlled to insure a uniform product. With dry sand the base permeability can be used as an index of uniformity. That operation requires only use of the standard permeability meter and accessories with two base permeability screens. Any unusual deviations in distribution or size of sand grains immediately become apparent. Clay analysis should be performed periodically since presence of small amounts inhibits development of baked tensile strength and changes other physical properties of the sand.

Other tests described by Mr. Myers included those for baked permeability, tensile strength and hardness. He stressed the necessity of employing exact control in the laboratory as well as care in the various operations to obtain concordant results. Sufficient samples or specimens should be tested to provide a true picture.

Mr. Rowell said that the commonly recognized physical properties of cores are largely determined by the sand used. Hence, it is advisable to select a core sand of rounded or sub-angular grain of 45 to 100 fineness, fairly well sorted and substantially free from fines and clay. In general a sharp sand of high base permeability is desirable because it can be blended with finer sand such as bank sand to obtain closely controlled permeability in the correct range for the particular application of the sand mix.

Flowability of the core sand mix is influenced by grain size, shape and distribution, moisture content, and by the green strength and types and amount of binders in the sand. Usually flowability tends to decrease with increase of green strength. Mr. Rowell mentioned that probably the cleanest working core sand mix is one containing a high permeability sand bonded with 1 per cent corn flour, 1 per cent core oil and 2 to 4 per cent moisture. In some types of work a mixture composed only of sand and core oil is more suitable than with other binders. It always is advisable to use only enough cereal binder to obtain the necessary green strength.

Moisture in the sand mix should be kept as low as possible since the water must be vaporized before the core will bake. Percentage of binder should be kept fairly low to reduce the required baking time. Cores should not be stored in humid atmospheres since they will lose strength. Where cores have been weakened under such conditions, most of the strength is regained by drying briefly before use.

Surface of the core at elevated temperature should be slightly plastic and free to yield to inequalities of expansion and contraction. Remedies for excessive expansion include a sand with wider distribution, and additions of cereal, wood flour or other organic material, and perhaps softer ramming. Harder ramming with the proper amount of iron oxide will stop veining due to excessive contraction in the core surface. In conclusion, Mr. Rowell stated that before any material is placed in the core sand mix, its effect on each of the properties of the cores should be considered and changes made cautiously. Often more than one property is improved to the detriment of others. Each core is an individual problem and should be considered in the light of experience as well as with imagination.

Use Plastic Patterns

Plastics readily adapt themselves to the making of patterns due to their low shrinkage qualities of 0.002-in. per in. Speaking before the opening pattern session Thursday afternoon, presided over by R. J. Christensen, Wisconsin Pattern Works, Ladd Salach, president, Plastic Corp., Chicago, described the successful use of plastics in the duplication of single shrink patterns, broken aluminum plates, master patterns, cope and drag sections, and certain types of coreboxes.

Stemming from the wartime application of phenolic resins in the making of stretch press dies, the speaker described experimental work which led to the development of a plastic material which would meet the requirements of patterns for foundry use. Plastic patterns, he stated, withstand jolting and squeeze pressure—the finished plate being capable of absorbing any blow to which a pattern is subjected in use. Having a high

(*Continued on page* 216)

SPECIFY VANCORAM FERRO VANADIUM

FOR HIGHEST QUALITY ALLOY STEELS

Whether you produce wrought constructional steels, alloy steel castings, high speed tool steels or special-purpose steels, there is a grade of Vancoram Ferro Vanadium designed to meet your requirements. Our modern quality-control methods result in a higher quality product of dependable uniformity—thus assuring the steelmaker closer control and unexcelled microstructure and physical properties.

To cover the more common steelmaking needs we supply:

	Grade A (Open Hearth)	Grade B (Crucible)	Grade C (Primos)
Vanadium	35 to 40%	35 to 45%	35 to 45%
Silicon	12% max.	3.5% max.	1.25% max.
Carbon	3.5% max.	0.5% max.	0.20% max.

Special grades, containing up to 80% Vanadium, and Vanadium Metals, containing 90% and 95% Vanadium, are also available.

All grades are carried in stock and can be supplied in large lumps, or crushed or ground to any desired size. Our metallurgists will gladly discuss the application of Vancoram Ferro Vanadium in terms of your requirements.

MAKERS OF FERRO ALLOYS — VANCORAM — CHEMICALS AND METALS

VANADIUM CORPORATION OF AMERICA

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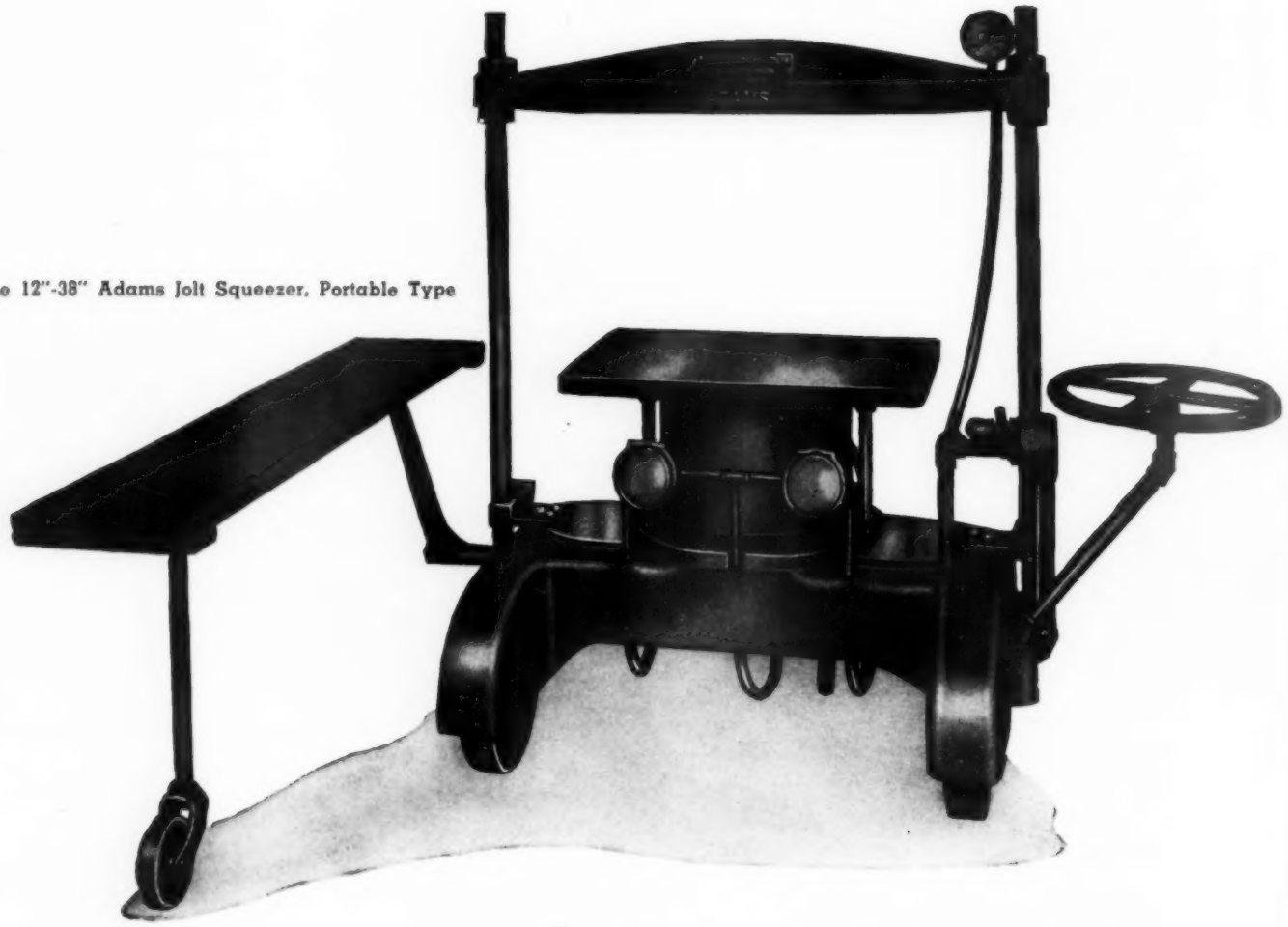
The 12"-38" Adams Jolt Squeezer, Portable Type



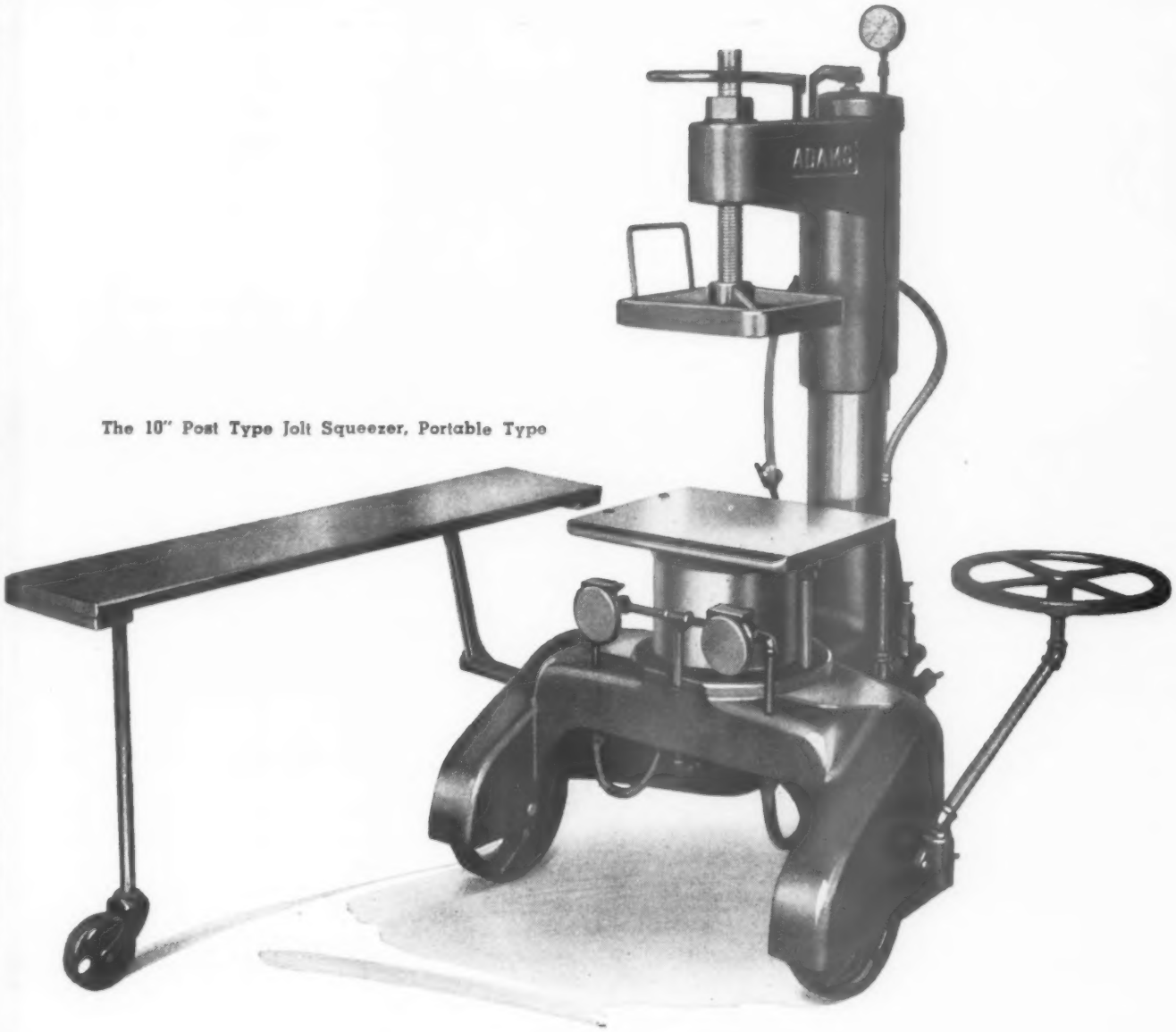
Adams Molding Machines give you these 10

The complete **ADAMS** *line of foundry equipment:*

Side Rod Jolt Squeezers • Post Type Jolt Squeezers • Hand Squeezers • Knee Valves • Table Rappers • Pattern Plate Vibrators • Tubular Sprue Cutters • Cherry Snap Flasks • Cherry Slip Flasks • Aluminum Slip Flasks • Easy-Off Flasks • Cherry Presser Boards • Wood Bottom Boards • Steel Bottom Plates • Steel Jackets • Aluminum Jackets • Cast Iron Jackets • Steel Bands • Steel Upsets • Cherry Upsets • Aluminum Upsets

THE ADAMS
DUBUQUE,

MOLDING MACHINES . . . . . FLASK



The 10" Post Type Jolt Squeezer, Portable Type

important advantages..

1. Valveless jolt mechanism—nothing to get out of order.
2. Adjustable knee valves for jolt and vibrator control leaves hands free.
3. Disc type operating valve assures easy control of squeezing operation.
4. Adams automatic oiler lubricates thoroughly and reduces maintenance.
5. Adams pressure regulator provides positive control up to line pressure.
6. Large cylinder bearing surface maintains alignment and minimizes wear.
7. Rust-proofed stop rods, side rods and adjusting nuts.
8. Completely protected against entry of sand and dust.
9. Easy rolling ball bearing wheels on portable models.
10. Standardized—all parts are interchangeable.

COMPANY

IOWA, U.S.A.

EQUIPMENT . . . . . Established 1883

MAN-TO-MAN
on the Molder's Bench

"Pride"

By RALPH L. LEE

SOME time ago a factory manager friend of mine wrote me about a bull session he had had with some of his buddies on the subject of employee relations. During this session he made the following point: "If we could sell our employees on taking pride in the company and its accomplishments we would have gone a long way toward solving our employee relations problems." My friend wanted to know how I felt about the matter.

I had hardly finished his letter when the old story of Christopher Wren and his three stone cutters came to mind. The one in which he stopped beside three stone cutters at work and asked them what they were doing. One replied that he was cutting stone at so much per, one according to print, and the other who was helping to build the temple. This story on top of my friend's letter yanked me up short to the realization that in spite of all the time which separates Sir Christopher Wren's day and ours, the same old question as to the relative merits of group incentives as against individual incentives is still bouncing around pretty much unsolved.

While it must be a grand sensation to so thoroughly forget self that we work only for a noble cause, something tells me from what I see going through factories and foundries that group incentives are being forced into the background in favor of individual incentives.

• • •

SO AFTER considerable thought I wrote my friend that to my way of thinking employee pride in his company was certainly a worthy mark for any manager to shoot at, but when you get right down to it it was more of a proof that a good employee relations job *had* been done than a means of getting it done—sort of a bonus or a balance sheet, but certainly not a tool.

I went on to tell him I was afraid sometimes that we who have the job of building a business, while at the same time making a name for ourselves, are asking one whale of a lot of the people we hire to help us when we expect them to take the same kind of interest in the overall building job we do.

Suppose, for example, I wrote, we decide to build a house, the kind of a house we have always wanted to build and one which will reflect all that we have learned as a result of living in houses. We expect this house to be a feather in our cap. So we hire an architect, an excavator, a concrete man, masons, carpenters, plasterers, tinsmiths, paper-hangers, painters and all the other folks we've got to have to get the job done.

I went on to say that I wouldn't be a bit surprised if any one of the specialists might drive by the house some Sunday afternoon when it was finished and point it out to his family with pride. But on the other hand, I felt quite sure that the pride he took in the overall job would be only a drop in the bucket compared with the pride he took in the particular part of the overall job he was personally responsible for.

In view of this I'm beginning to wonder whether we aren't putting the cart before the horse when we try to win employee loyalty and co-operation solely on a mass production basis.

While there can be no question that a clean, good looking and comfortable plant, tiled locker rooms, bang-up cafeterias, hospitals, plant papers, sport activities, annual picnics, insurance, pension and profit sharing plans are all wonderful devices for attracting and keeping effective employees, I have very good reasons to believe that they are not enough in themselves—something else must be added.

Unless I miss my guess a good employee would be willing, if he had to, to sacrifice many of these general issue conveniences for the privilege of being recognized as the only Spike Johnson in the place, the only one who works on the second machine from the office door on the south wall of department D, and the particular one to whom folks come to get a certain type of work done well.

• • •

MY ANSWER to my friend stirred up quite a spirited correspondence ping-pong game but we eventually settled down seeing eye to eye on somewhat of a give-and-take basis, there being so darned many angles to this subject. In any event, we both agree now that employee pride in the company and interest in its accomplishments is just about the best possible goal any of us can have, but that it is only a *goal* and not a *process*. In fact, only a bonus for doing a bang-up man-by-man, man-to-man personal relations job. It seemed to us that the key to the whole matter was clearing the decks so that each individual employee can, if he's got it in him, take pride in his own job.

This, of course, involves one whale of a lot—the will to do it in the front office shared by everybody else who directs the efforts of others—enough of the right kind of foremen, with time to do the job and the ability to sell.

We also agreed that such a job is a long haul project that will never be completely finished but one that will pay big dividends from the start to any outfit from the smallest to the largest. And by the way, we also agreed that good healthy working conditions and pleasant surroundings would multiply these dividends.

Pulverizing mill (foreground) and grinding mill (background).

Industrial track on ripple at crusher building.

Conveyor leaves crusher and goes over the hill.

REVIVO *Moves to a New Site..*

In Order to Maintain Revivo Quality

Revivo Bond has been mined on a 640-acre tract at Eifort, Ohio, since 1906. Now, leaving behind much clay that does not meet our standards, we move our operation to a 3000-acre tract at Bondclay, Ohio (see map). Revivo is known as the strongest refractory bond clay in America. That quality must be maintained.

Modern, complete facilities are suggested by the photographs. Our own railroad switch is 3400 feet long. Clay moves continuously from loading shovel to car. Our 1200-ft. conveyor belt is probably the longest in the industry. The use of automatic bag-packing and sewing machinery is an innovation. All operations are mechanized.

Revivo's unrivalled strength and low first cost will continue to make its economy outstanding. Bulletin on request. Come and see our new plant.

EASTERN CLAY PRODUCTS, INC., JACKSON, OHIO

Roof conveyor extends length of steel storage shed.

Dragscraper distributes clay in storage.

DIXIE BOND • BLACK HILLS BENTONITE • REVIVO BOND • REVIVO SUPER BOND • BALANCED REVI

ECP

all TYPES OF BONDING CLAYS

A Foundry Sand Service Based Upon Practical Research

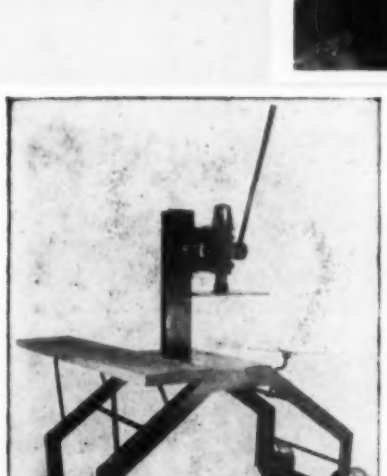
RAPID
MOLDING MACHINES

Fast!

Economical!

Simple!

Easy to Run!



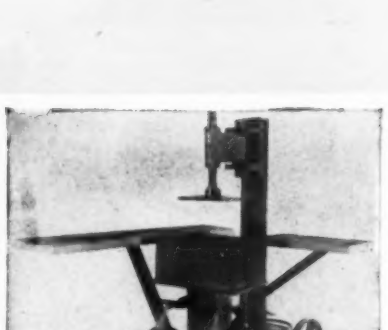
WRITE for NEW BULLETIN "F"

PORTABLE HAND SQUEEZER

* A production-booster ideally suited to simple pattern work. Its low cost will surprise you.

PORTABLE JOLT SQUEEZER

* Equipped with knee valves for operating jolt and vibrator, hand-operated squeeze valve. A dependable unit, moderately-priced.



PIONEER
Manufacturing Company
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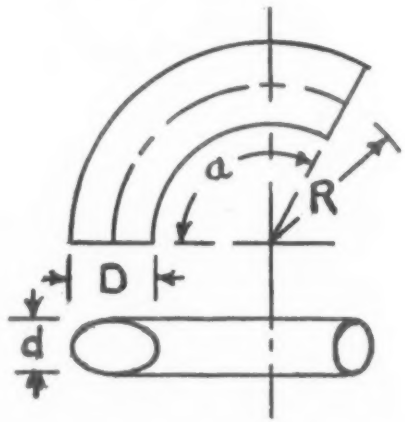
FORMULAS FOR DETERMINING THE WEIGHTS OF CASTINGS

(*Continued from March*)



To find the weight of a segment of a ring of elliptical cross section, multiply the radius of the circle passing through the center of the cross section by the large diameter of the ellipse, by the small diameter, by the number of degrees in the angle, by the value of K. (See Table XVIII).

$$W = RDdaK$$

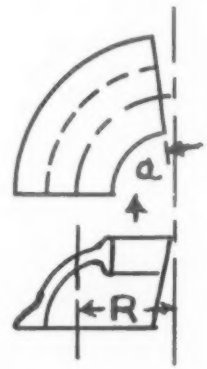
Table XVIII

Wt. per cu. in.	K	M	C	Wt. per cu. in.	K	M	C	Wt. per cu. in.	K	M	C
.096	.000180	.000080	.000279	.250	.000468	.000209	.000727	.410	.000763	.000342	.001193
.100	.000187	.000084	.000291	.260	.000485	.000217	.000756	.420	.000787	.000351	.001222
.110	.000206	.000092	.000319	.270	.000505	.000226	.000785	.430	.000805	.000359	.001251
.120	.000224	.000101	.000349	.280	.000524	.000234	.000815	.440	.000824	.000367	.001280
.130	.000243	.000109	.000378	.290	.000543	.000242	.000844	.450	.000843	.000376	.001309
.140	.000262	.000117	.000407	.300	.000562	.000251	.000873	.460	.000861	.000384	.001338
.150	.000281	.000126	.000436	.310	.000581	.000259	.000902	.470	.000880	.000392	.001368
.160	.000299	.000134	.000465	.320	.000600	.000267	.000931	.480	.000898	.000401	.001397
.170	.000313	.000142	.000496	.330	.000618	.000276	.000960	.490	.000917	.000409	.001426
.180	.000337	.000151	.000524	.340	.000636	.000284	.000989	.500	.000936	.000418	.001455
.190	.000356	.000159	.000553	.350	.000655	.000293	.001018	.510	.000955	.000426	.001484
.200	.000375	.000167	.000582	.360	.000673	.000301	.001047	.520	.000973	.000435	.001513
.210	.000394	.000176	.000611	.370	.000692	.000309	.001076	.530	.000992	.000443	.001542
.220	.000413	.000184	.000640	.380	.000711	.000318	.001106	.540	.001010	.000451	.001571
.230	.000431	.000192	.000669	.390	.000730	.000326	.001135	.550	.001029	.000459	.001600
.240	.000450	.000201	.000698	.400	.000749	.000334	.001164	.560	.001048	.000468	.001629

Interpolation Table

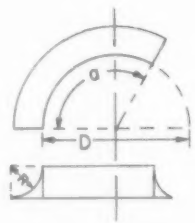
Add'l. Wt.	Add'l. K	Add'l. M	Add'l. C	Add'l. Wt.	Add'l. K	Add'l. M	Add'l. C	Add'l. Wt.	Add'l. K	Add'l. M	Add'l. C
.001	.000002	.000001	.000003	.004	.000007	.000003	.000012	.007	.000013	.000006	.000020
.002	.000004	.000002	.000006	.005	.000009	.000004	.000015	.008	.000015	.000007	.000023
.003	.000006	.000003	.000009	.006	.000011	.000005	.000017	.009	.000017	.000008	.000026

For method of interpolation, see Table II



To find the weight of a segment of a solid generated by revolving a plane area about an axis, multiply the area by the distance from the center of gravity of cross-section to the axis, by the number of degrees in the angle by the value of N in Table XVII.

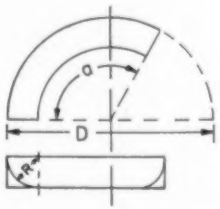
$$W = ARaN$$



To find the weight of a sector of an inside circular fillet, multiply the difference between the diameter of the cylinder made by the side of the fillet and the product of the radius and 0.446, by the radius squared, by the number of degrees in the angle, by the value of K corresponding to the weight per cubic inch of material used (see Table XVIII) or, from the diameter of the cylinder made by the side of the fillet, multiplied by the radius squared, by the number of degrees in the angle, by K, subtract the radius cubed by the number of degrees by M.

$$W=(D-0.446R)R^2aK \text{ or } W=DR^2aK-R^3aM$$

FORMULAS FOR DETERMINING THE WEIGHTS OF CASTINGS



To find the weight of a sector of an outside circular fillet, multiply the sum of the diameter made by the side of the fillet and the product of the radius and 0.446, by the radius squared by the number of degrees in the angle, by K, or to the diameter of the cylinder made by the side of the fillet multiplied by the radius squared, by the number of degrees, by K, add the radius cubed multiplied by the number of degrees, by M.

$$W=(D+0.446R)R^2aK \text{ or } W=DR^2aK+R^3aM$$

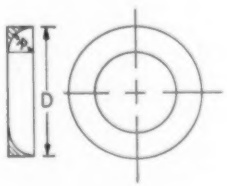
Table XIX

Wt. per cu. in.	K	M	C	Wt. per cu. in.	K	M	C	Wt. per cu. in.	K	M	C
.096	.0647	.0289	.0105	.250	.1686	.0752	.2617	.410	.2764	.1233	.4293
.100	.0674	.0301	.1047	.260	.1753	.0782	.2722	.420	.2832	.1263	.4398
.110	.0742	.0331	.1152	.270	.1820	.0812	.2827	.430	.2899	.1293	.4503
.120	.0809	.0361	.1257	.280	.1888	.0842	.2931	.440	.2966	.1323	.4607
.130	.0876	.0391	.1361	.290	.1955	.0872	.3036	.450	.3034	.1353	.4712
.140	.0944	.0421	.1466	.300	.2023	.0902	.3142	.460	.3101	.1383	.4817
.150	.1011	.0451	.1571	.310	.2090	.0932	.3246	.470	.3169	.1413	.4922
.160	.1079	.0481	.1675	.320	.2157	.0962	.3351	.480	.3236	.1443	.5027
.170	.1146	.0511	.1780	.330	.2225	.0992	.3456	.490	.3304	.1473	.5131
.180	.1214	.0541	.1885	.340	.2292	.1022	.3560	.500	.3371	.1503	.5236
.190	.1281	.0571	.1989	.350	.2360	.1052	.3665	.510	.3438	.1533	.5341
.200	.1348	.0601	.2094	.360	.2427	.1083	.3770	.520	.3506	.1563	.5446
.210	.1416	.0631	.2199	.370	.2495	.1113	.3874	.530	.3573	.1594	.5550
.220	.1483	.0662	.2303	.380	.2562	.1143	.3879	.540	.3641	.1624	.5655
.230	.1551	.0692	.2408	.390	.2629	.1173	.4084	.550	.3708	.1654	.5760
.240	.1618	.0722	.2513	.400	.2697	.1203	.4189	.560	.3776	.1684	.5864

Interpolation Table

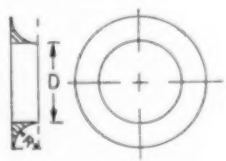
Add'l. wt.	Add'l. K	Add'l. M	Add'l. C	Add'l. wt.	Add'l. K	Add'l. M	Add'l. C	Add'l. wt.	Add'l. K	Add'l. M	Add'l. C
.001	.0007	.0003	.0010	.004	.0027	.0012	.0042	.007	.0047	.0021	.0073
.002	.0013	.0006	.0021	.005	.0034	.0015	.0052	.008	.0054	.0024	.0084
.003	.0020	.0009	.0031	.006	.0040	.0018	.0063	.009	.0061	.0027	.0094

For method of interpolation, see Table II



To find the weight of an inside circular fillet, multiply the difference between the diameter of the cylinder made by the side of the fillet and the product of the radius and 0.446, by the radius squared, by the constant K, corresponding to weight per cubic inch, or from the diameter of the cylinder made by the side of the fillet multiplied by the radius squared, by the constant K, subtract the radius cubed multiplied by constant M. (See Table XIX.)

$$W=(D-0.446R)R^2K \text{ or } W=DR^2K-R^3M$$



To find the weight of an outside circular fillet, multiply the sum of the diameter made, by the side of the fillet and the product of the radius and 0.446, by the radius squared by the value of K, or

To the diameter of the cylinder made by the side of the fillet, multiplied by the radius squared, by the constant K, add the radius cubed multiplied by the value of M.

$$W=(D+0.446R)R^2K \text{ or } W=DR^2K+R^3M$$

(To be concluded)

Redford CORE BLOWER CARTRIDGE TYPE

A few of the thousands of cores that are made daily on Redford Core Blowers.

• PROVEN •

Hundreds of foundries are using Redfords as an efficient low cost means of producing small cores. The high percentage of reorders we receive proves that Redfords are profitable to own.

• SIMPLICITY •

The Redford reduces core blowing to its simplest form. Anyone can understand—operate and maintain it.

• SPEED •

All the work of handling core box and driers is done on the machine. Cartridges can be quickly loaded by hand. As many as 200 boxes are being blown and drawn by one operator in one hour.

• FLEXIBILITY •

With a Redford you can make any number of different cores without loss of time for changeovers. Here is what a large jobbing foundry has to say: "We are using 7 Redfords. Your development of the portable cartridge which can be made a part of the core box equipment, has given us all the advantages of core blowing without loss of flexibility so essential to us."

SAND CARTRIDGES AVAILABLE IN 10 STANDARD SIZES

Blower comes complete, ready to use. Each blower provided with one Size "C" sand cartridge which is adaptable to a large range of core boxes. Cartridges are available in nine additional standard sizes and special sizes furnished where needed.

WE HAVE THE "KNOW HOW" AND WILL ASSIST YOU IN SOLVING YOUR CORE BLOWING PROBLEMS

Redford IRON & EQUIPMENT CO.

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ALL CANADIAN CONFERENCE

Sponsored by Two AFA Chapters

By PAT DWYER
Engineering Editor
THE FOUNDRY

FROM an attendance point of view and the interest shown in the various items on the program, the first All Canadian Foundry Conference Feb. 28 and March 1 in the Royal York hotel, Toronto, was an unqualified success. The first day was devoted to plant visitation. On the following day simultaneous sessions in separate rooms were conducted on problems connected with the four main divisions of the foundry industry—gray iron, malleable iron, steel and nonferrous metals. Social and entertainment features centered in a luncheon and dinner Friday, and a luncheon on Saturday.

List of plants open for inspection included the Aluminum Co. of Canada at Etobicoke, sand and permanent molds; Canadian Bronze Co. Ltd., general jobbing; Dominion Foundries & Steel Ltd., cast and rolled products; Fittings Ltd., Oshawa, gray iron and malleable castings; Grinnell Co. of Canada Ltd., second floor foundry, gray iron and malleable castings; Gurney Foundry Co., Ltd., boilers, furnaces, radiators; Standard Pattern Co.; Sully Foundry Division, Neptune Meters Ltd., Mechanized, capacity 500,000 lb per month, nonferrous castings; A. H. Tallman Bronze Co., Ltd., Hamilton, semi-production, castings from 1 oz to 3000 lb; Canadian Westinghouse Co. Ltd., Hamilton, mechanized foundry, gray iron and nonferrous castings in wide variety.

At the Friday luncheon, Toronto Mayor Robert H. Saunders, a dynamic personality, claimed it was indeed a pleasure to have the privilege of extending cordial greetings. He was delighted that Toronto had been selected for the first all Canadian conference and hoped the visit would be repeated. He pointed out in a proper patriotic manner that Toronto is a great industrial center where the contributions made by its foundries have played no small part in the development and growth. Near the close of the meeting an announcement that J. A. Wotherspoon, Ontario Chapter chairman, and general chairman of the conference, had been taken to a hospital for an emergency operation, was met with the adoption of a unanimous resolution of condolence to be forwarded immediately to Mr. Wotherspoon. At a later function an appreciative reply indicated that Mr. Wotherspoon was keenly disappointed at his inability to attend the conference.

Prof. J. C. Cameron, Queen's University, speaker on "Industrial Relations" at the conference banquet.

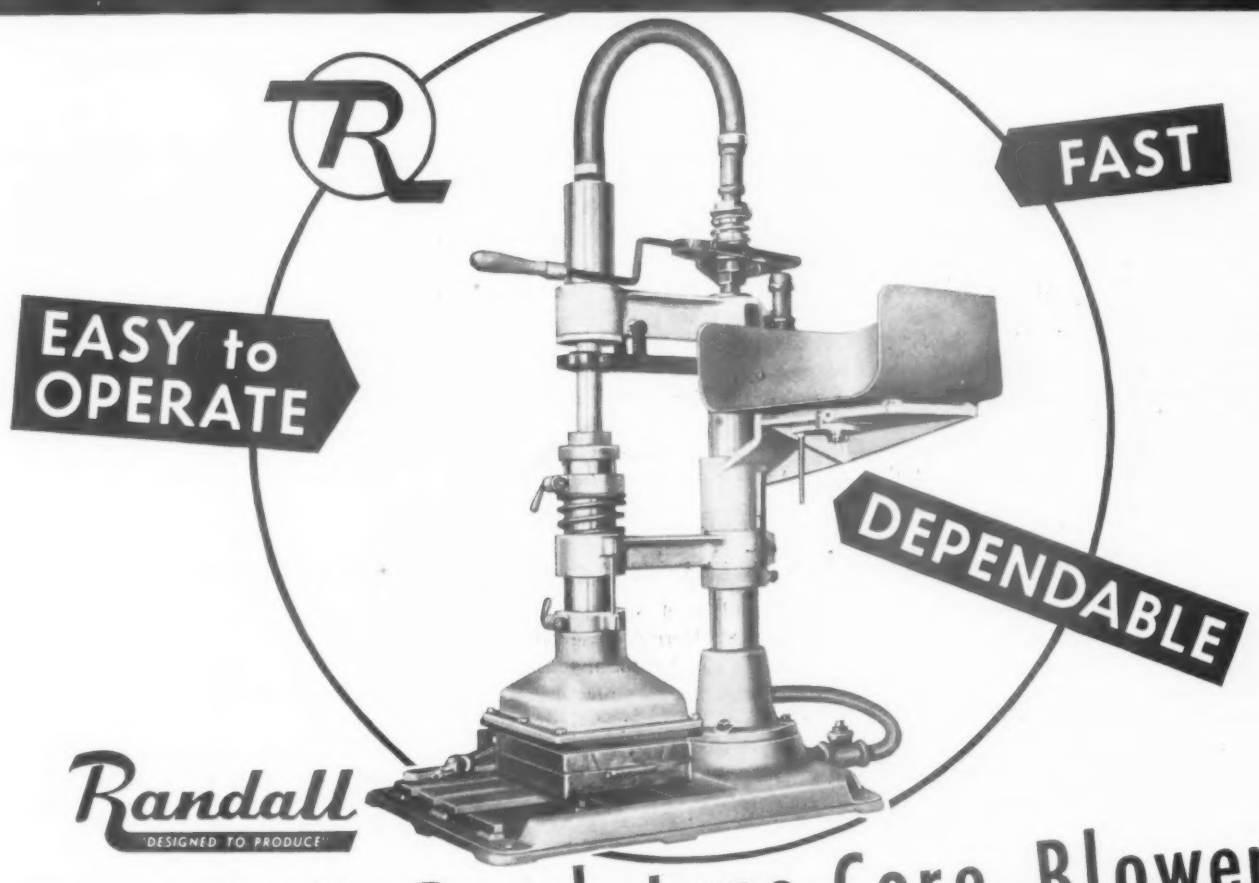
Speaking at the luncheon meeting Sheldon Wood, president, American Foundrymen's Association, stated that the spirit of the underlying purpose of the Canadian foundry conference is splendid evidence of the great degree of co-operation existing between Canadian and American foundrymen. In an interesting and vigorous manner he discussed several phases of the foundry industrial situation with particular emphasis on the necessity of developing a program that would attract men to the foundry. With labor cost the greatest item in the expense of operating a foundry, the selection, training and supervision of the employees deserves the sharpest attention on the part of the management.

Notable features at the banquet Friday night included enthusiastic group singing of a collection of foundry parodies on popular songs written by Harry Doran, eastern Canadian representative, Whiting Corp., Harvey, Ill.; an exceptionally clever and entertaining floor show and an address on the subject of industrial relations by Prof. J. C. Cameron, Queen's University, Kingston, Ont. Disclaiming any partisanship in the age-old differences of opinion between capital and labor, the speaker dwelt principally on conditions as they now exist and the various acts of legislation which have been enacted in an effort to promote

(*Continued on page* 282)

Banquet speaker's table at the First All Canadian Conference held recently in Toronto. Left to right are: Sheldon V. Wood, president, AFA; J. A. McFadyen, past chairman Ontario Chapter; Joseph Sully, director, AFA; W. J. Brown, director Eastern Canada and Newfoundland Chapter; William W. Maloney, secretary, AFA; A. E. Cartwright, vice chairman, Eastern Canada and Newfoundland Chapter, and Pat Dwyer, engineering editor, *The Foundry*.

CUT Core Room Costs



The NEW Bench-type Core Blower

No sand cartridges

Show us a foundryman who is interested in cutting costs and we'll show him one way to go about it. We'll show him the RANDALL CORE BLOWER.

A bench-type blower, the RANDALL boasts many exclusive features which serve to increase production in the core room from three to five times over ordinary and old-style core-making methods. The RANDALL'S swing-type blow head permits the blowing of multiple cores without refilling, while the 360-degree turning radius of the head makes it readily adaptable to core boxes of all shapes. *A single operation simultaneously clamps the head and blows the core,* and additional features like the RANDALL RAPID-CHANGE PLATE and the RANDALL SNAP-ACTION TOGGLE SIDE CLAMP contribute still further to the blower's efficiency and serviceability.

Write for complimentary descriptive bulletin.

THE RANDALL CORPORATION

2636 SO. MAIN ST.
ELKHART, IND.

AFA AWARDS HONOR SIX FOUNDRYMEN

(*Concluded from page* 93)

National Carbon Co., Cleveland, and then became research engineer, Commonwealth Edison Co., Chicago. During World War I he was a captain in the chemical warfare service of the Army, engaged in the manufacture of high explosives at Willoughby, O. He became service manager, Detroit Electric Furnace Co., Detroit, in 1919, remaining there until 1923 when he became associated with Detroit Lubricator Co. as chief metallurgist. In 1938 he was placed in charge of the nonferrous foundry, the Crane Co., Chicago. Mr. St. John has been active in the field of nonferrous metallurgy and served as chairman of the Nonferrous Division of the AFA. He is also a member of the American Institute of Mining and Metallurgical Engineers, the Electrochemical Society, American Chemical Society, American Society for Metals, and has been active in committee work in all of these organizations.

Richard A. Flinn Jr. received the degree of bachelor of science in chemical engineering from the College of the City of New York in 1936, and a year later was granted the degree of master of science in metallurgy by Massachusetts Institute of Technology. From 1937 to 1939 he was metallurgist, International Nickel Co., New York, in field and laboratory development of high strength cast iron, and spent the following year as a member of the staff of the department of metallurgy, Massachusetts Institute of Technology. He became associated with American Brake Shoe Co. in 1941 as a member of the metallurgical staff at Mahwah, N. J. Mr. Flinn has been active for a number of years in technical committee work of both the AFA and Gray Iron Founders' Society.

John Grennan was born at Azalia, Mich., and recevied his technical training at the University of Michigan and University of Nebraska. Following a period as foundry apprentice with the Ann Arbor Machine Co., he worked as journeyman in various foundries in the Middle and Far West, before accepting a position as instructor in forge and foundry practice at the University of Nebraska. Later he held similar positions at the University of Illinois, Michigan Agricultural College and the Army Vocational School at Camp Grant, Ill., during World War I. While he was instructor in foundry practice at University of Michigan he was active in AFA committee work, serving as a member of the Committee on Apprentice Training, the Subcommittee on Technical Exhibits of the Program and Papers Committee, and the Committee on Foundry Nomenclature co-operating with the International Foundry Committee.

Sheldon V. Wood, a native of Jefferson, Iowa, was graduated from the University of Minnesota in 1904. He worked as a mining engineer with Butler Bros., Hibbing, Minn., for a year, and from 1905 to 1907 was engaged in engineering work with the Great Northern Railway, St. Paul. For the following five years he was a sales engineer with Olds Gas Engine Co., Lansing, Mich. He joined Minneapolis Electric Steel Castings Co. in 1913, as manager, later becoming president. Mr. Wood was active in the organization of the Twin City Chapter of the AFA, of which he was a director. He was a director of the national organization from 1942 to 1945 and has been prominent in the work of the Steel Division Advisory Committee of the association.

Marks 75th Anniversary This Year

FOUNDED in 1872, Standard Horse Nail Corp., New Brighton, Pa., is celebrating its 75th anniversary this year.

The company was started originally in Fallston, Pa., by Charles Morris Merrick, inventor and born mechanic of exceptional ability. In 1882 the company was destroyed by fire and was rebuilt in New Brighton the following year. This factory has since been in continuous operation.

Mr. Merrick died in 1914 and was succeeded as president by Fred S. Merrick. Following in turn, the presidents to date were C. M. Russell, S. C. Merrick and the present head, G. B. Sheers.

Charles M. Merrick invented and perfected automatic hot-forging and finishing machines for the manufacture of horse shoe nails. The same exclusive process is used today for the manufacture of horse shoe and foundry chill nails. These nails are formed from ⅜ to ½ in. special analysis round steel bars in coils. Bars are descaled and flattened before being fed from a reel into an automatic gas-fired furnace in preparation for the automatic hot-forging of the nail blanks.

In addition to horse shoe and foundry chill nails, the company manufactures taper and straight pins, woodruff keys and machine keys of all types, machine rack and cotter pins.

G. B. SHEERS

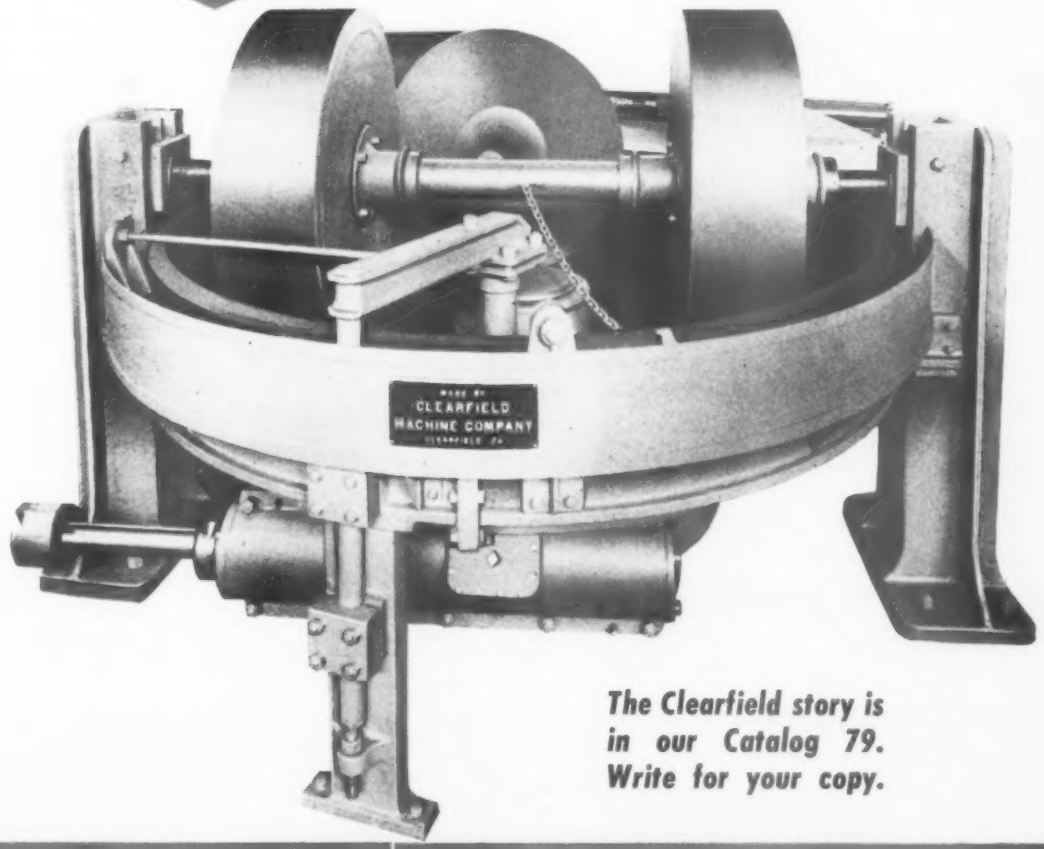
Six of Standard Horse Nail Corp's seven veteran employees with over 350 years of service. Including the number of years they have been with the company, they are: Back row—Charles Pfeifer (51), Frank Powell (51), Charles Vlair (51), Oliver Molter (45); front row—Flora Helble (47), Clara Crede (50). John Wassmuth with 57 years is missing from the photo

Our CLEARFIELD MIXER has been
OPERATING DAILY since its installation
and doing a PERFECT JOB.

Taken from a statement by a typical Clearfield user, these three terms are synonomous . . . "the Clearfield Mixer", "Operating Daily" and "Doing a Perfect Job." Wherever you find the Clearfield, you find the other three.

The ability to maintain daily operation over long periods of time stems from the Clearfield's rugged construction—out of this daily operation rises the economy of continuous running with no shutdowns.

Its perfect mixing is the result of Clearfield experience and research which has brought about the principle of the revolving pan and its complete sand mulling job during all the time in which the mixer is in operation—another economy.



The Clearfield story is in our Catalog 79. Write for your copy.

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MIXES, TEMPERS AERATES

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PENNSYLVANIA, U. S. A.

Activities of Foundry GROUPS

Central Indiana

THE Industrial Foreman in Postwar America" was the subject of a talk by M. F. Stigers, associate professor of trade and industrial education, Purdue University, Lafayette, Ind., at the Feb. 3 meeting in Indianapolis of the Central Indiana Chapter of the AFA.

Professor Stigers devoted the first part of his talk to "Management on the Job," stating that management must include the foreman, general foreman, superintendent, factory superintendent and company president.

He went on to say that postwar America needs better leadership. Men must be trained and have a definite amount of "job know-how" to be good leaders. It can be said that most people don't do as good a job as they could. People must train themselves to do the best they can and always try to improve.

According to Professor Stigers, all industrial foremen may be considered to be practicing psychologists. They must know how to get along with their men and also with various supervisory levels. They should know how to instruct subordinates. Foremen must know tests and testing and how to apply and use them. Foremen should obtain and be able to use cost control information. Factual information regarding job ratings and merit ratings should be available to all supervision levels. Safety and housekeeping should be made interesting and instructive.

Professor Stigers devoted the second part of his talk to "Management in the Community." He stated that all of us should use our qualities of leadership outside the shops. We should become interested in civil affairs, school affairs and church affairs. The different groups, both social and political, should be studied and used for our advantage.

G. C. Dickey, Harrison Steel Castings Co., Attica, Ind., served as technical chairman.—*J. P. Lentz.*

Metropolitan

SOME 350 members and guests attended the Metropolitan Chapter of the AFA meeting held Feb. 3 at the Essex House, Newark, N. J., to hear Zigmond Madacey, foundry superintendent, Caterpillar Tractor Co., Peoria, Ill., present a paper entitled "Core Blowing."

Mr. Madacey stated that equipment for core blowing is less costly than is generally believed and that jobbing and semi-production foundries might benefit by using the method to lower costs and to obtain more accurate cores. To produce cores by blowing, it is necessary that the foundry control the following factors:

1. Sand: The moisture in sand for blowing cores should range from 1.8 to 2.5 per cent depending on the grain size, and the moisture should be controlled to within 0.2 per cent of the desired amount for the grain size used. A sand that is too dry causes excessive wear to the core box and a sand that is too wet does not blow. Green compression strength of a good sand for blowing should be approximately 1.5 psi, and oil should be used at the rate of about 50 parts of sand to one part of oil by volume.

2. Size and location of blow holes and vent holes in the corebox: These depend on the size and shape of the box, and the foundryman can gain information about the subject readily by experimenting. The air that enters the box must be vented and, therefore, the total area of the vents must equal or be greater than the area of the blow hole. Air pressures used in blowing cores can range from 85 to 125 psi. Lower blowing pressures cause less wear on the corebox but require large blow and vent holes.

With the aid of slides, Mr. Madacey showed how several different coreboxes could be blown from a machine with very little setup time through the use of a master blow plate. Views were shown of the layout of a department using core blowers and the construction of the boxes with devices for holding loose pieces in place during the blowing. Other slides also showed blown cores which would be extremely difficult to make by hand with any degree of accuracy.

William F. Rose, Smith Oil & Refining Co., acted as technical chairman for the meeting.—*C. J. Law.*

Southern California

CRUCIBLES in the Foundry Industry," was the topic of a talk given by Leo A. Behrendt, crucible and refractories division director, Joseph Dixon Crucible Co., before the Feb. 14 meeting of the Southern California Chapter of the AFA.

Mr. Behrendt stressed the fact that crucible construction materials are responsive to the intense heats to which they are subjected. This should lead foundrymen into a line of clear-cut reasoning accenting the following points:

In breaking in a new crucible, don't load it until red heat is reached.

Of the two types of crucibles—clay graphite and carbon bonded—the former must be properly annealed; the latter does not need annealing. Proper annealing and extreme care of the clay graphite type is prescribed routine. This is the most widely used type.

A tong and shank which would fit a standard clay graphite crucible of a given size would be too small for a carbon bonded crucible of the same size and would pinch and crack it. Carbon bondeds are economical to use, especially where

(*Continued on page* 184)

NONFERROUS CHAPTER: William D. Jeffers, retired president of Union Pacific Railway (third from left) at Non-Ferrous Founders' Society dinner in Los Angeles. Next on his left are Al Goodrow, chairman of the Southern California Chapter; Robert R. Haley, national director; Herman Buckholtz, chapter secretary, and Walter Storm, chapter vice president. On Mr. Jeffers' right are two of his colleagues on the Los Angeles Anti-Smog Committee, on which subject Mr. Jeffers addressed the meeting

100 POUNDS NET WEIGHT
MOGUL
BRAND
CEREAL BINDER
CORN PRODUCTS REFINING CO., NEW YORK, N.Y.
1660-1 · LOT 193
MOGUL is a perfect Green Bond, which increases permeability in cores. Use MOGUL in cores for both green and dry strength.
MOGUL works with core oil because it decreases drying time and yields smooth cores. MOGUL works perfectly with pitch or rosin, too, because cores can be handled while still warm. MOGUL is widely used with sharp sands.
KORDEK
KORDEK is a perfect DRY BOND. It can be used in smaller quantities than most dry binders. KORDEK produces better castings with fewer discards.
CORN PRODUCTS SALES CO.
17 BATTERY PLACE · NEW YORK 4, N. Y.

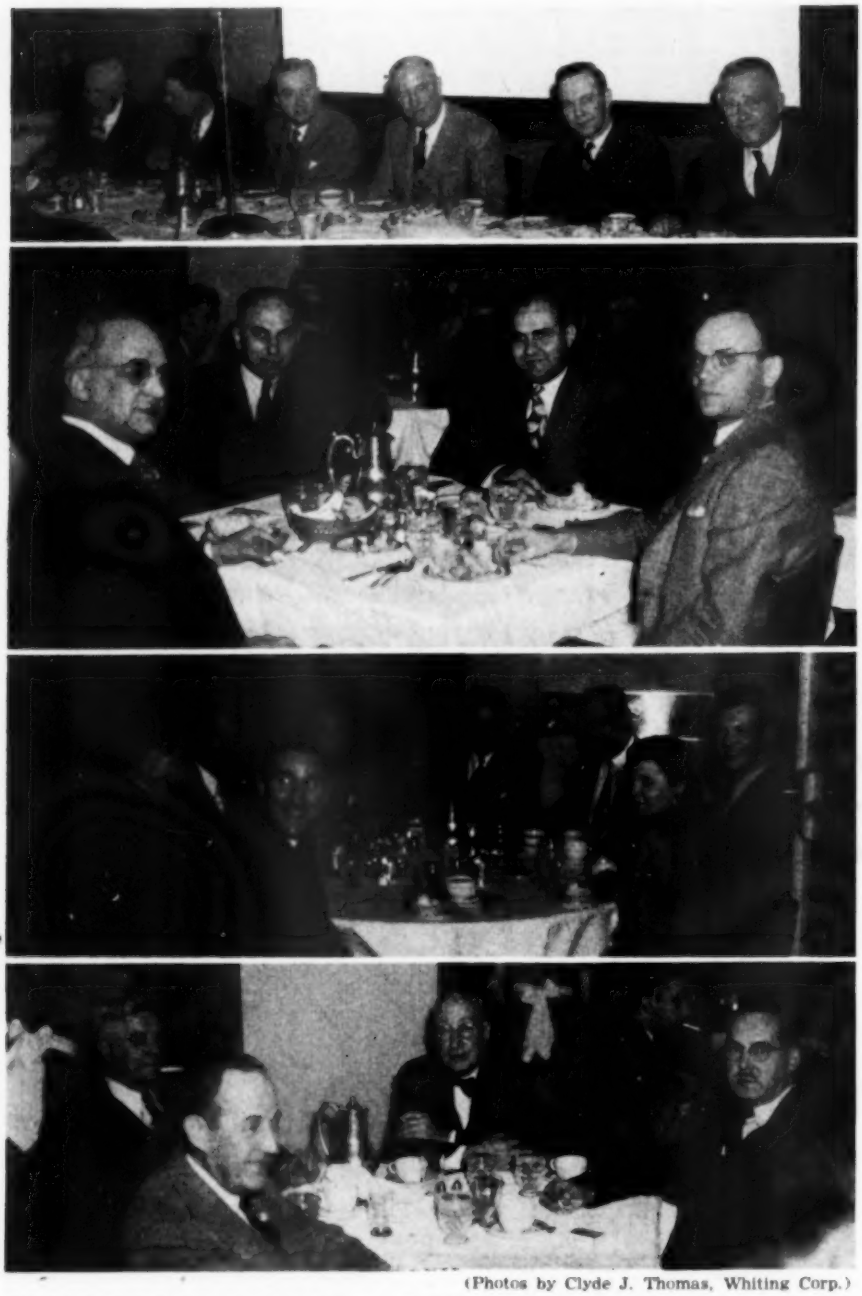
(*Continued from page* 182)

inexperienced help is doing the melting.

Cheap, low-temperature fusion cements often are responsible for poor furnace maintenance. The best cements are the cheapest in the long run.

Mr. Behrendt holds open-flame furnaces in low esteem. Experience shows that melting nonferrous metals and alloys is more expensive per ton of sound castings in an open flame furnace than in modern crucibles. This cost lies in capital, interest and depreciation, cost of fuels, maintenance, labor for melting, metal lost in volatilization and oxidation or interaction between metal and container.

Comparing this with modern crucible melting, the latter method gives more complete control of furnace reactions along with protection from gas pick-up and from contamination from previous charges, according to Mr. Behrendt.—*Maurice Beam.*



(Photos by Clyde J. Thomas, Whiting Corp.)

CHICAGO—February meeting views of Chicago Chapter, AFA, shows: top panel, left to right—Roy Frazier, Love Bros. Inc., Aurora, Ill.; George W. Anselman, Goebig Mineral Supply Co.; Laurence H. Hahn, Sivyer Steel Casting Co., chapter president; Sheldon V. Wood, national AFA president; Bruce Simpson, National Engineering Co.; J. E. Kolb, Caterpillar Tractor Co. Second panel—E. R. Young, Climax Molybdenum Co.; S. C. Massari, AFA; Herman J. Pfeifer, Electro Metallurgical Sales Corp.; H. F. Scobie, AFA. Third panel—Ben A. Patch, Ohio Ferro-Alloys Corp.; N. L. Mooneyham, Velsicol Corp.; John Behen; Charles O. Howe, Baroid Sales Co.; Lester B. Knight, Lester B. Knight & Associates; T. J. Magnuson, J. S. McCormick Co.; Elaine Barclay; Victor Rowell, Velsicol Corp. Bottom panel—James Thomson, Continental Foundry & Machine Co.; Max F. Becker, M. F. Becker & Associates; A. W. Gregg, Whiting Corp.; Erle F. Ross, *The Foundry*

Saginaw Valley

SAGINAW Valley Chapter of the AFA presented its first educational program this year in the form of a series of four lectures covering the principal phases of foundry operations. Lectures were held at Arthur Hill Trade School, Saginaw, Mich., on the evenings of Jan. 9, 16, 23 and Feb. 13.

Each evening the program began with a lecture on the selected topic by the discussion leader. This was followed by a discussion period in which a selected panel of experienced men from local foundries answered questions from both the audience and the discussion leader. Slides and moving pictures obtained through the courtesy of local plants were shown to assist in presenting the material in as clear a fashion as possible.

Discussion leaders and their panels were as follows:

Jan. 9, "Pattern Equipment and Rigging," Fred Serr, General Foundry and Mfg. Co. Panel—Harold Sieggreen, Saginaw Malleable Iron Plant, General Motors Corp.; Hartley Ball, Buick Motor Division; George Schebler, Chevrolet Grey Iron Foundry; Harold Miller, Dow Chemical Co.

Jan. 16, "Cupola Melting Practice," Lyle L. Clark, Buick Motor Division. Panel—James Bowen, Chevrolet Grey Iron Foundry; Joseph Clark, Saginaw Malleable Iron Plant; Howard Wilder, foundry division, Eaton Mfg. Co.; Kenneth Priestley, Vassar Electroloy Products.

Jan. 23, "Molding and Coremaking," Don Bowman, Almont Mfg. Co. Panel—Frederick Kent, Buick Motor Division; Frank Bean, General Foundry & Mfg. Co.; John F. Smith, Chevrolet Grey Iron Foundry; Arthur Clark, Saginaw Malleable Iron Plant; S. R. Grant, Bostick Foundry.

Feb. 13, "Cleaning, Grinding & Inspection," M. C. Godwin, Bostick Foundry. Panel—Harvey Durham, Chevrolet Grey Iron Foundry; Norman Henke, Saginaw Malleable Iron Plant; Abe Hall, Buick Motor Division; Fred Snider, foundry division, Eaton Mfg. Co.

Fee for the entire course was $1. To encourage attendance of students, admission for them was free. Attendance records showed that an average of 140

(*Continued on page* 186)

At the sound of the *musical note*

When you tap this grinding wheel, a clear answering note tells you that it is free from cracks, just as the Simonds Abrasive label tells you that it is ready for top performance on the job. This performance efficiency is characteristic of all Simonds Abrasive Wheels . . . a precision manufactured line of the most minute variations of grain, grade, structure and bond, skillfully engineered into thousands of abrasive combinations for every industrial use. Careful handling will prolong the efficiency of these performance proven wheels. The tap test is a quick way of determining whether essential wheel care is being maintained.

The Simonds Abrasive Data Book contains information you need for better grinding results. Send for your copy today. For assistance in requisitioning consult your nearest Simonds Abrasive Distributor.

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SIMONDS ABRASIVE COMPANY, PHILADELPHIA 37, PA.
DISTRIBUTORS IN ALL PRINCIPAL CITIES

(*Continued from page* 184)

persons attended each lecture, one of them drawing 225. The chapter was especially gratified to note the interest shown by students who constituted from one-third to one-half of those in attendance.

Jack Smith, chapter chairman, has announced the intention of the chapter to present another series of lectures next winter.

New England

OVER two hundred members and guests of the New England Foundrymen's Association met at the Engineer's Club, Boston, Feb. 12, to hear James B. Fifield, foundry metallurgist, N. E. Section, International Nickel Co. Inc., speak on "The Inoculation of Gray Cast Iron, How and Why."

Mr. Fifield defined inoculation as a ladle addition of an inoculating agent to molten cast iron. The largest and strongest group of inoculants are silicon-bearing alloys. Most of the alloys contain, in addition to silicon, other elements that are added to produce alloying effects beyond inoculation.

He went on to say that inoculation changes cast iron because it changes the form and distribution of the graphite and carbides in gray iron. Inoculation tends to convert excess iron carbides into graphite, to convert types D and E graphite to type A and to insure uniform graphite flake size from the surface to the center of a casting. These three functions of inoculation help prevent chilled edges and hard spots and improve all the engineering properties of an iron, particularly toughness and wear resistance. High strength castings should be made with steel in the charge, be alloyed and be inoculated when class 40 and over specifications must be met.

Inoculants should be added to the hottest iron at the cupola spout, or poured into a ladle one-third full of iron, according to Mr. Fifield. From ⅛ to ½-in. lumps should be used and the iron should be poured quickly.

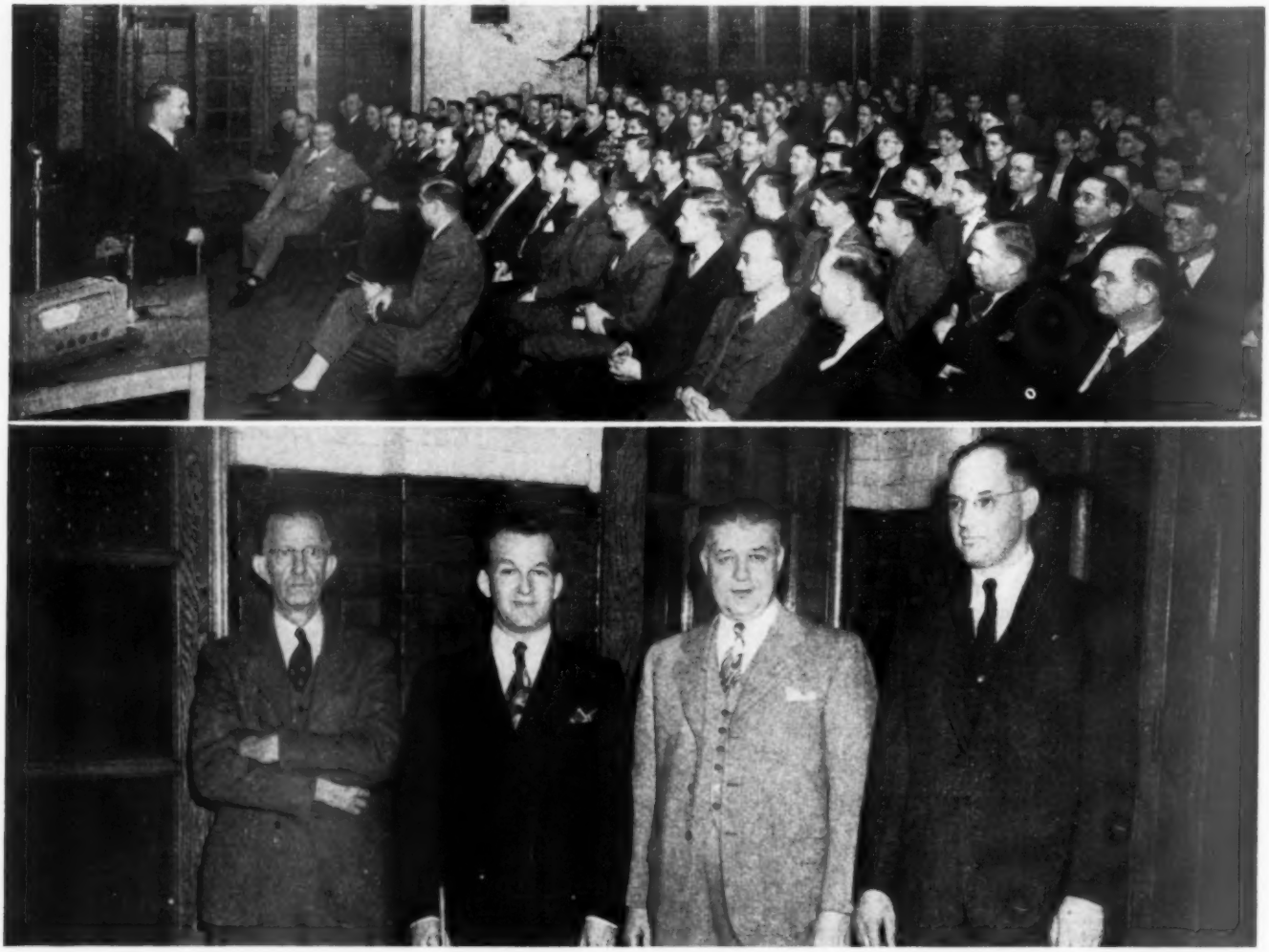
The necessary quantity of inoculant should be determined by means of chill control, for it varies with the total carbon of the iron, the carbon-silicon balance, the thickness of metal section and the presence of alloys in cupola iron. Chill control indicates the effectiveness of the inoculation and the necessary amount of inoculant to be used.—*Merton A Hosmer.*

Reading

REGULAR monthly meeting of the Reading Foundrymen's Association was held in the Walnut Room, Berkshire Hotel, Reading, Pa., Feb 18. One hundred members and guests heard John L. Carter, Gray Iron Founder's Society Inc., speak on "Practical Foundry Cost Accounting." I. Rentz, Textile Machine Works, served as technical chairman for the evening.

Mr. Carter gave many examples of

(*Continued on page* 188)



FOUNDRY LECTURE: Views at the educational lecture held Jan. 23 by the Saginaw Valley Chapter of the AFA. This was one of a series of four lectures covering the principal phases of foundry operations. Top: Don Bowman, speaker for the meeting, addressing the group on "Molding and Coremaking." Bottom, left to right, Frank Bean, General Foundry & Mfg. Co.; Don Bowman, Almont Mfg. Co.; John Smith, chapter chairman, Chevrolet Gray Iron Foundry; and Marshall Chamberlin, program chairman, Dow Chemical Co., Bay City.

Pouring a one ton heat from a size "ST" Lectromelt.

You can Service small orders better ...

with MOORE RAPID *Lectromelt* FURNACES

In a highly competitive market there will be a greater need than ever for service to customers in the matter of small orders to exact specifications, etc. In an effort to meet that need foundries and steel plants may well consider the Moore Rapid Lectromelt Furnace. Look, for instance, at these advantages —

Small heats to meet needs exactly and economically may be had by tapping part of a heat and altering the remainder to meet other specifications.

Additional economy is accomplished with the top charge type furnace through substantial savings in time between "power off" and "power on".

Top charge furnaces in sizes from 100 tons down to 250 pounds. Write for complete details on these Lectromelt features.

PITTSBURGH LECTROMELT FURNACE CORP.

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Why You Find

SPENCER TURBO COMPRESSORS

in Foundries Everywhere

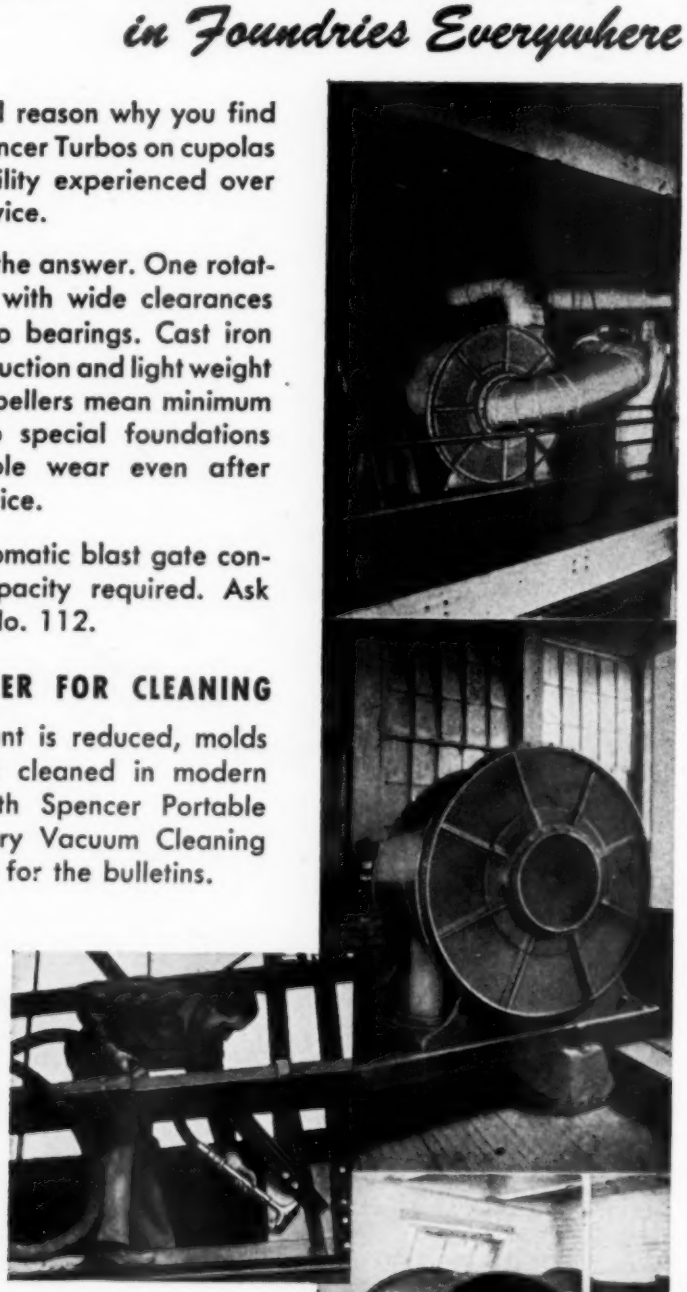
The principal reason why you find so many Spencer Turbos on cupolas is the reliability experienced over years of service.

Simplicity is the answer. One rotating element with wide clearances and only two bearings. Cast iron bridge construction and light weight balanced impellers mean minimum vibration, no special foundations and negligible wear even after years of service.

Hand or automatic blast gate control—any capacity required. Ask for bulletin No. 112.

AND SPENCER FOR CLEANING

The dust count is reduced, molds and patterns cleaned in modern foundries with Spencer Portable and Stationary Vacuum Cleaning Systems. Ask for the bulletins.



ASK FOR BULLETINS

Foundries	No. 112
Data Book	No. 107
Gas Boosters	No. 109
Four Bearing	No. 110
Blast Gates	No. 122
Technical Bulletin	No. 126

332-B

SPENCER HARTFORD

THE SPENCER TURBINE CO.
HARTFORD 6, CONN.

(*Continued from page* 186)

standardized simple methods of keeping accurate foundry costs. A question and answer period followed his address.

Rex Harrison, membership committee chairman, introduced H. S. Gilhams, proprietor of H. S. Gilhams Co., Philadelphia, as a new member. On behalf of the association, President Bruce W. Edris congratulated John Robb on his nomination as a national director of the AFA. —*W. I. Cassidy.*

Northwestern Pennsylvania

REGULAR monthly meeting of the Northwestern Pennsylvania Chapter of the AFA was held in the Blue Room, Moose Club, Erie, Pa., Feb. 24. Sixty-six were present for the dinner and 100 attended the technical session.

Walter E. Sicha, research metallurgist, Aluminum Co. of America, Cleveland, spoke on "Aluminum Alloys, Castings, Fabrications and Applications." Mr. Sicha described methods of fabricating aluminum by various processes, including rolling, extruding, punch extruding, die-casting, permanent mold casting and sand casting.

The question-and-answer session following the talk and illustrating pictures centered largely around sand casting processes. Causes of porosity, voids and gas holes were discussed.

Special entertainment in the form of a motion picture of the 1946 World Series sponsored by the Louisville Slugger Co. and A. G. Spaulding Co. was a feature of the evening.

The Venango group of the chapter met at the Arlington Hotel, Oil City, Pa., Feb. 21, to hear Dr. J. A. Ritterhof, Frederic B. Stevens Co., Detroit, speak on "Coatings for Cores and Molds." About 70 members attended this meeting, one of three held yearly by the group.

Dr. Ritterhof discussed the various materials and their qualities as coatings. Methods of cost reduction while at the same time increasing the effectiveness of the coatings were also described. The value of good housekeeping in the storing and use of coating materials cannot be underestimated, according to Dr. Ritterhof.

The chapter is sponsoring a "Grand Slam" night, April 21, starting with a banquet at the Masonic Temple, Erie, Pa., to pay tribute to more than 500 men from its area who have been active in the foundry industry for 30 or more years. In addition, management executives of the industry will be honored along with the national AFA officers.

Major premise of the entire activity, in addition to an honest effort to pay tribute to the "Old Timers," is a re-

(*Continued on page* 190)

DANGER! Luxury at work!

THIS MAY NOT SEEM TO BE A LUXURY. **But every time you use a bar or any other manual tool to free your castings . . . it costs you money! It costs you time! It costs you production! Yes . . . a bar is a luxury!**

BUT WHEN ROBINS FLOATEX SHAKEOUTS ARE PUT TO WORK—

They do your job cheaper. They're "Job-Engineered" to free *your* castings . . . at *your* specific production rate.

They do your job faster. They bounce tons free in minutes, not hours.

They do your job better. They shake the flask, not the building. Flasks and castings are shaken free without injury.

Yes . . . you'll find it pays to check with Robins first! Remember, there's a portable or standard Robins Floatex Shakeout designed for *your* job.

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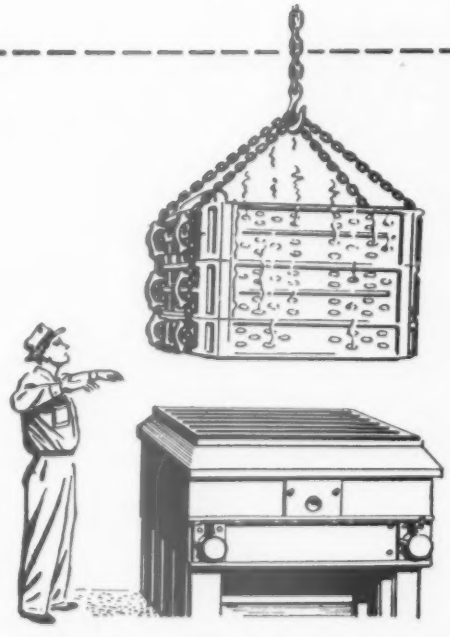

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CHEAPER . . . FASTER . . . BETTER

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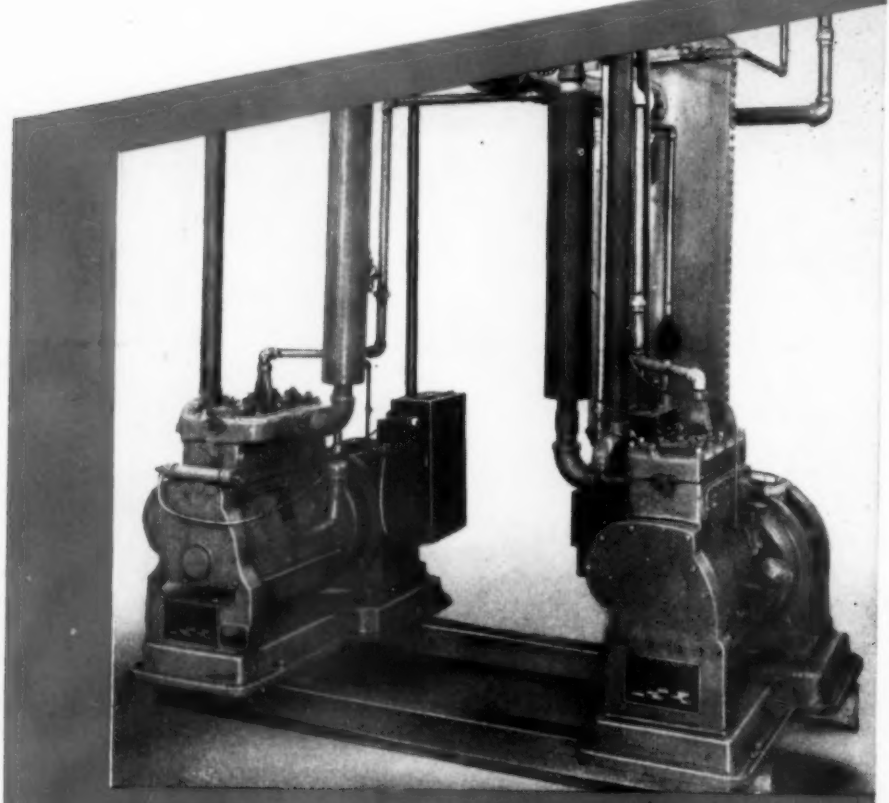
Schramm Compressors are better because they are 100 per cent watercooled . . . compact and lightweight . . . have mechanical intake valve and forced feed lubrication!

Schramms come in a variety of sizes. So whatever your need for compressed air . . . there's a Schramm to do the job. Write today for illustrated booklets and plan to use a Schramm in the New Era now facing Industry!



SCHRAMM INC.

THE COMPRESSOR PEOPLE

WEST CHESTER, PENNSYLVANIA

(*Continued from page* 188)

cruiting drive for foundry workers. As a build-up to the occasion, the chapter is sponsoring a series of newspaper advertisements and publicity releases telling the public of its activity. Theme of the campaign is "Your Future in the Foundry."

Supplementing the advertising campaign, a booklet entitled "Your Future in the Foundry," dealing with the foundry industry in northwestern Pennsylvania specifically, is being prepared for distribution.—*John E. Gill.*

Michiana

APPROXIMATELY fifty members of the Michiana Chapter of the AFA braved severe weather to meet in the Bronzewood Room, Hotel LaSalle, South Bend, Ind., Feb. 4, to hear a talk by W. E. Sicha, research metallurgist in the Cleveland Research Division, Aluminum Co. of America. Vern Spears, chapter secretary, presided in the absence of chairman John McAntee.

Mr. Sicha presented an interesting sound film entitled "Aluminum," and followed with a discourse on the various processes used in the making and processing of aluminum in order to acquaint his listeners with the possible uses of this material.

During the question period, Mr. Sicha outlined methods and practices necessary to produce high quality aluminum castings. Members representing the nonferrous section participated in the discussion, submitting problems encountered in actual practice.—*S. F. Krzeszewski, publicity chairman.*

Central New York

NINETY members and guests of the Central New York Chapter of the AFA traveled approximately 6600 miles to attend the regular monthly dinner meeting at the Onondaga Hotel, Syracuse, N. Y., Feb. 14.

Speaker for the evening was Prof. Joseph Jeffrey, Cornell University, who presented the third of his series of talks on "Metallurgy." Professor Jeffrey's talk covered the iron-carbon diagram and its applications and the Jominy method for determining the hardenability of steels. He stressed the fact that the Jominy process was invaluable during the war when the desired steel was not always available.

Following Professor Jeffrey's talk, the meeting divided into three groups for round-table discussion. J. Bibbison, Malleable Founders' Society, led the malleable iron group. J. F. Dobbs, superintendent, metallurgical and physical lab-

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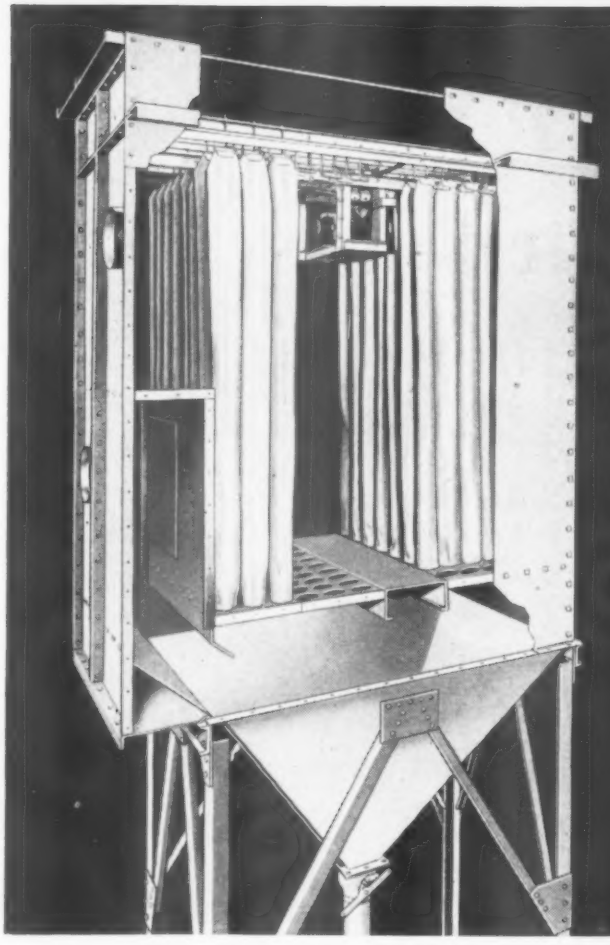

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Cost less to operate and Maintain

The filter cloth in a Dustube lasts longer because it is never under tension . . . never in contact with metals that abrade and corrode. With the Dustube you can be absolutely certain the cloth is in perfect condition because inspection can be made so quickly and easily . . . there is nothing to disassemble. Appreciable savings in power result by reason of the fact that resistance to air flow is reduced by providing large expansion areas, by ample spacing of tubes, and by the effectiveness of the shaker method of cleaning the cloth. Other important savings accrue by reason of the ease and speed with which tubes can be installed and replaced . . . it takes less than a minute per tube and only one man is required.

only *DUSTUBE* gives you all these design advantages

HIGH EFFICIENCY

Actual performance results prove that DUSTUBES meet the most exacting requirements. Extremely fine dusts particularly those within the low micron size range, such as silica are trapped with nearly 100% efficiency.

LOW COST MAINTENANCE

A DUSTUBE filter can be installed in a few seconds by ONE MAN, using no tools. He merely hangs the tube on a hook attached to the shaker channel overhead, and inserts the spring band in the cell plate below.

MONEY SAVING ECONOMY

There are few working parts to wear. Power savings are effected by less over-all resistance to air flow, and a fast acting, highly efficient shaker method of thoroughly cleaning the cloth.

EXTENDED CLOTH LIFE

Wear on the cloth of a DUSTUBE is negligible because the tubes are never under tension . . . there are no metal contacts to corrode or abrade . . . coarse, heavy dusts are carried into the hopper before they reach the cloth.

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Filter tubes in a DUSTUBE can be readily inspected without removing them. The operator can view every tube from a central walkway in the Knocked-Down type collector, or from the doorway of an assembled type collector.

Write today for more complete information about the many advantages of DUSTUBE dust collectors. Ask for Catalog 72.

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DUST COLLECTORS

AS IT MULLS . . .

the Speedmullor Cools and Removes Fines

An Interesting Report of Foundry Operations at UNION STEEL CASTINGS
(Division of Blaw-Knox Co.)
Pittsburgh, Penna.

A Condensation of An Article From The Beardsley & Piper Co.'s "Better Methods"

• *The Speedmullor is the only mullor that cools as it mulls. Its mulling action is the most thorough and the fastest!*

• *A batch of sand has just been cooled and mulled in the Speedmullor and is going, via conveyor, into the Speedslinger's portable tank.*

• *This core room Speedmullor, because of its fines removal feature, enables Union Steel to reclaim at least 25% more old core sand than they did before it was installed. Its mulling cycle is less than 2 minutes.*

When molding sand is quickly reused, that means hot sand. And hot sand, of course, cannot be properly mulled.

In the green sand bay of Union Steel Castings, there is a complete turnover in sand about every five or six hours. When the hot sand leaves the floor level shake-out, it is conveyed by belt to a screen and magnetic pulley belt unit where foreign matter is removed. It then goes to the boot of a bucket elevator and carried to a 500-ton storage bin. From this bin it is discharged into the Speedmullor as needed.

With the rapid turnover of sand in normal operation it is very hot, usually from 300°F. to 350°F. However,

(Continued on following page)

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this No. 70 Speedmullor is equipped with air cooling which brings the sand down to a desired 90°F. *in less than 2 minutes.* Thus, the Speedmullor solves another hot sand problem and no valuable time is actually used for the cooling process because the machine is thoroughly mulling the sand *as it cools.* The Speedmullor is the only mullor that cools as it mulls and it mulls a batch to exact desired specifications in less than ¼ the time required by any other mullor.

• *Union Steel's three Speedslingers have increased mold output by over 25%!*

This Speedmullor is also equipped for fines removal. The pre-determined amount of fines which are removed are taken through a wet collector and discharged into a sludge box for disposal. This system prevents fines from going into the air, keeping it clean and thus providing much better working conditions.

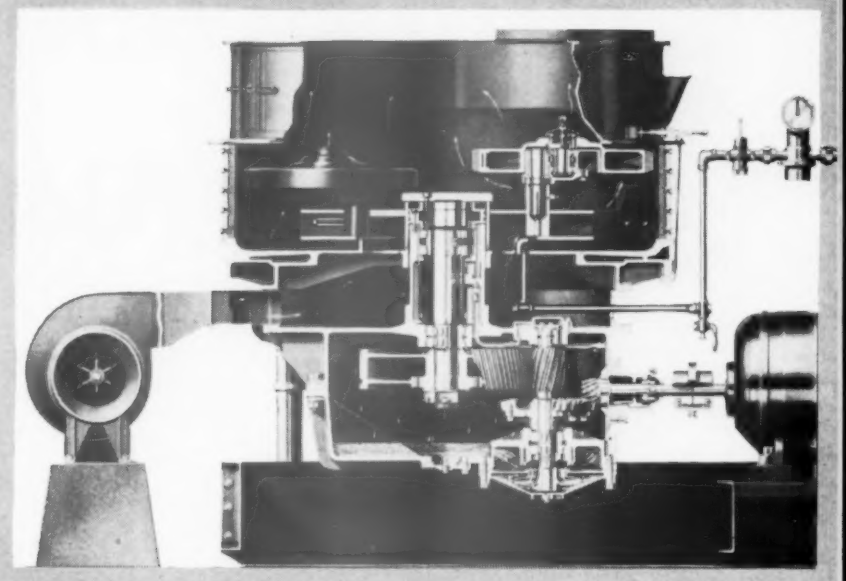
• *John Solmon, Ass't Works Manager of Union Steel Castings inspects a casting—sand for which was Speedmullor-mulled and molds Speedslinger-rammed.*

Union Steel has two other Speedmullors. One is a No. 70 that mulls facing and backing sand in the dry sand bay. Its mulling cycle is approximately 2½ minutes. It, too, is equipped with air cooling and fines removal. Another No. 70 Speedmullor mulls the core sand in 2 minute cycles. Previously, a conventional mixer took 8 to 10 minutes to mull a batch of core sand.

The Beardsley & Piper Company, 2424 N. Cicero Ave., Chicago 39, Ill.

Speedmullor

SPEEDCOOLER too!



• *Cross-section view of a Speedmullor with air cooling. This dual purpose machine cools hot shake-out sand while it mulls, an extremely important feature to foundries where sand is rapidly reused. Arrows indicate direction of cooling air as it goes upward through the sand.*

The Speedmullor is at least 4½ times faster than any other mulling equipment. Speedmullor action assures thorough distribution of all additions—the sand is freed from lumps and requires no further aeration. It is the only machine that mulls the sand between a rubber-lined wall and rubber-tired wheels. These surfaces will not destroy the sand grain structure and will outlast steel many times.

Speedmullors assure large savings in core oils and binders and produce a sand mix which provides cleaner, smoother castings. They are available in a variety of sizes, with or without air cooling, skip-hoist, fines removal.

See the Speedmullor operate in a nearby foundry! We will make complete arrangements—write today.

HOT SAND COOLED & MULLED IN THE FASTEST MOST THOROUGH WAY

That's the Speedmullor With Air Cooling!

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(*Continued from page* 190)

oratory, New York Air Brake Co., Watertown, N. Y., headed the gray iron section. G. M. Thrasher, R. Lavin & Sons Inc., Elmira, N. Y., directed the nonferrous meeting.

This was the third meeting of the season to feature round-table discussions following the main speaker's lecture, and from the amount of interest shown it is evident they have increased members' participation in chapter activities.—*J. A. Feola, publicity chairman.*

Central Ohio

ELMER C. ZIRZOW, National Malleable & Steel Castings Co., Cleveland, gave an interesting and worthwhile talk on control of core sand properties at the gray iron and malleable section of the Feb. 24 meeting of the Central Ohio Chapter, AFA. The talk was followed by an active discussion period. The speaker outlined the fundamentals of sand control and discussed the properties of various binders and the influence of the nature of the sand grains on the results obtained.

Mr. Zirzow's remarks may be summarized as follows: (1) Sand control starts with specification and control of raw materials, as neglect at this stage makes subsequent control very difficult, (2) If only a limited number of sand tests can be performed, control of moisture is by far the most important one; (3) Sand tests in themselves are relatively worthless unless the results of the tests are correlated with actual experience in the foundry; and (4) In spite of a considerable amount of effort directed toward sand control tests, we still do not know very much about the subject, and it is likely that, within ten years, some other types of tests will supplant those now being used. In the discussion which followed, causes and remedies for various casting defects due to sand were given.

A very informative discussion of the subject "Scabbing and Buckling" in steel foundry practice, was presented by J. B. Caine, Sawbrook Steel Casting Co., Cincinnati. Since most of the widely accepted sand tests yield very little direct information on the problem of scabbing and buckling, Mr. Caine developed a rather simple and effective test of his own. The sand to be tested is rammed up into standard AFA 2-in. diameter test cylinders. Before filling the specimen tube, a steel nut for a ½-in. bolt is placed in the center of the bottom of the tube. The nut has some wire stubs welded onto it in order to reinforce the cylinder so that the sand cylinder can be picked up by screwing a ½-in. threaded rod into the nut. The prepared sand cylinder may then be

PREPARES SAND THOROUGHLY AT LOW COST!

Screenarator! Lowest Cost Portable Sand Conditioner! Ideal for Small, Medium and Large Foundries!

Height and angle of screen makes shoveling easy. Discharging of conditioned sand controlled to place it any desired distance within 25 ft.

THE SCREENARATOR

The operator easily moves Screenarator to desired position from floor to floor. Electrically operated, it plugs into an available power outlet.

The Screenarator thoroughly screens the sand . . . frees it from core butts, gaggers and other foreign matter. It cuts and breaks lumps, aerates the sand, and then aerates it for the second time when it piles the conditioned sand wherever desired.

Remember . . . sand quality determines casting quality. Proper sand preparation is of utmost importance to foundries . . . so get more information on the Screenarator today. Write for catalog.

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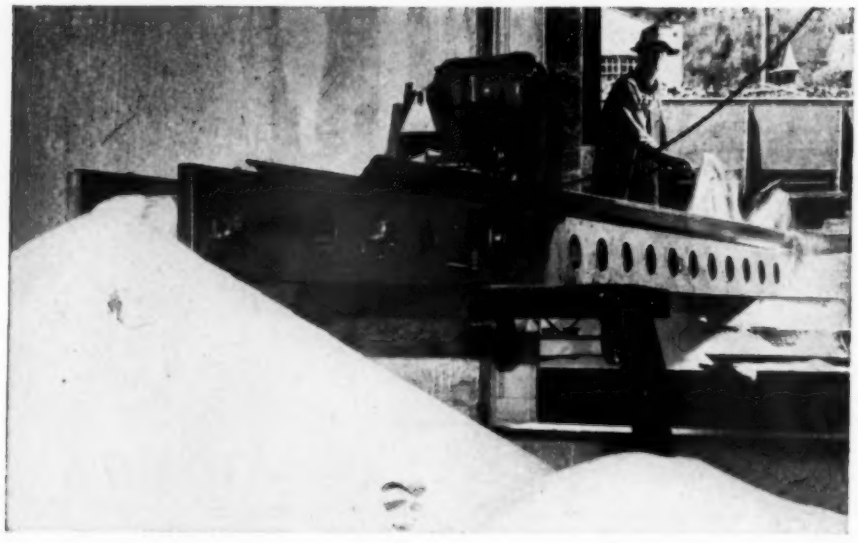
IT'S A B & P PRODUCT! SANDSLINGER • SPEEDSLINGER • SPEEDMULLOR • MULBARO • SCREENARATOR • SAND CONDITIONING MACHINE • CHAMPION FLASK LIFT MACHINE



the light conveyor that can take it!

TOTE-ALL handles foundry sand faster and with less cost.

Shown above is a Tote-All Portable Conveyor being used to unload foundry sand from a box car into a covered shed. Keeps two men busy shoveling sand into conveyor—steps up their efficiency by making the work easier for them. *(Actual tests show that a Tote-All Conveyor cut 14 hours time from hand-shoveling method during the unloading of a 75-ton car of core sand).*

Tote-All Conveyors are built for the toughest kind of usage, but are lightweight and easy to handle. Power unit, either gasoline or electric, is mounted on top of conveyor—easily accessible and out of the way of dust, dirt and spillage. Available in 14 ft. and 20 ft. lengths. With the Trail-Hoist (combination trailer and lifting device), the Tote-All can be easily moved from one job to another and delivery end of conveyor raised to desired height with hydraulic lifting device. Get full details on the standard Tote-All for all round foundry use or the new lightweight Zephyr model which may be used for handling sand or annealing coal.

Photo at left shows Tote-All Conveyor being used to unload a car of pig iron at a west coast foundry. Tote-Alls are used for many jobs at foundries—handles bulk material up to 14 in. top size.

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WRITE FOR BULLETIN F

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tested in three ways: (1) by holding it just above the surface of molten steel in a hand ladle, thereby simulating the effect of having the cope face of a mold subjected to the heat of the steel filling the mold; (2) by immersing the sand cylinder in the steel, which would correspond to the conditions in the drag face of the mold, and (3) alternate immersion and withdrawal, which would approach conditions in a mold where metal flows somewhat intermittently over elevated surfaces in the drag into deep cavities.

Although several thousand cylinders have been tested in this manner, the results obtained do not always agree with many preconceived notions of the behavior of sands at high temperatures. Since actual mold conditions are approached, the results of these tests are more readily interpreted than previous types of sand tests. Corn or wheat flour additions to bentonite-bonded sands are essential if scabbing and buckling are to be avoided.

The April 21 meeting of the chapter will feature round-table discussion and will be held at the Chittenden Hotel, Columbus, O. C. E. Sims, Battelle Memorial Institute, will lead discussion in the steel section on "Porosity and Gases," while Tom Barlow of Battelle will be the discussion leader in the gray iron section on the subject of "Inoculation."—*D. E. Krause, reporter.*

New Jersey

A WORTH-WHILE labor law, containing badly needed reforms, will come out of this session of Congress, U. S. Congressman Fred A. Hartley Jr. (R., N. J.), chairman of the House labor committee, predicted at a meeting of the New Jersey Foundrymen's Association, Newark, N. J., Feb. 24.

Speaking before a gathering of more than 100 members and guests on the subject of proposed federal labor legislation, he outlined various proposals under consideration by the House labor committee, but declared that in framing their proposals, the committee members are having to bear in mind that the proposals must be of a nature sufficient to attract enough votes in Congress to over-ride a possible presidential veto once the legislation is whipped into shape. Significantly, he pointed out, that President Truman in his annual address earlier in the year on the state of the nation had made only one reference to the need for revised labor legislation and that was in connection with jurisdictional strikes.

Present as guests of the New Jersey Foundrymen's Association to hear Congressman Hartley's timely discussion were

(*Continued on page* 200)

GRINDERS... ALL KINDS!

MOTOR DRIVEN — BALL BEARING

FOR VITRIFIED AND HIGH SPEED WHEELS.

SINGLE OR MULTIPLE SPEED.

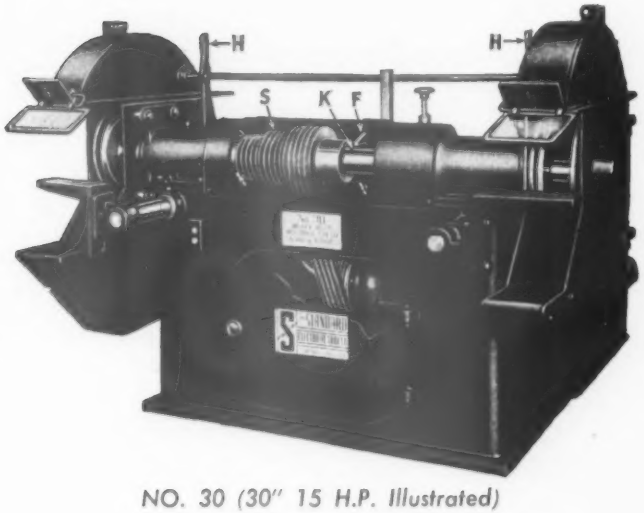
TYPE GA
(7½ H.P. 20" Illustrated)

Belted Motor Driven Grinders are Modern Tools. There is a greater clearance for the work in relation to the front of the machine and the face of the wheel.

Then, too, the ratio on the V-belt Drive permits providing the correct peripheral speed on either Vitrified or Resinoid Bond Wheels.

The Multiple Speed Machine allows for obtaining maximum wheel wear, lower wheel cost, higher production, all by maintaining the peripheral speed throughout wheel life.

Type GA shown above is a Pedestal Model Grinder. Distance between wheels is 30". Sizes: 5 H.P. 18", 5 H.P. 20" and 7½ H.P. 20" wheels.
The No. 30 Grinder illustrated at the right made in sizes of 5 H.P. for 18" wheels up to 15 H.P. for 30" wheels. Larger motors to order. The distance between wheels is 55" or 59".



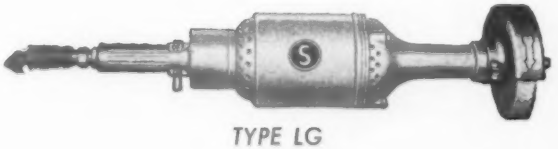
NO. 30 (30" 15 H.P. Illustrated)

EQUIPMENT on these two Grinders:

*Boiler Plate Steel Guards, adjustable to wheel wear.
*Multiple V-belt Drive.
*Ball Bearing Motors.
*Speed Control on Multiple Speed Grinders.

Optional:

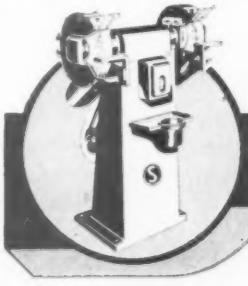
Single Speed or Multiple Speed.
Flanges for large bore wheels.



TYPE LG

Write for our Complete Catalog which describes "GRINDERS—all kinds!", from ½ H.P. to 30 H.P. Also a complete line of Disc Grinders. Long Distance phone Wabash 1677.

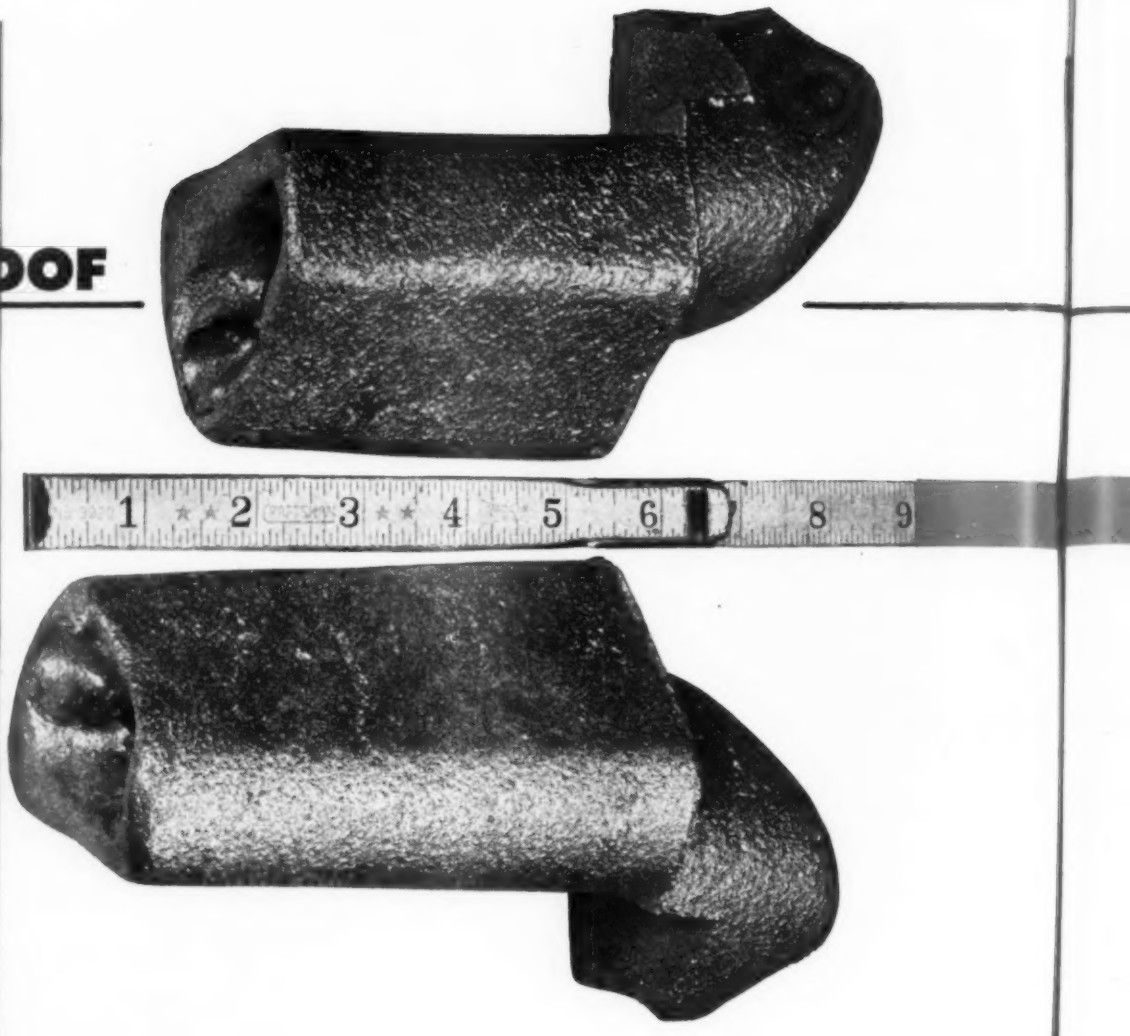
The Type LG is a light weight Portable Grinder with 3 phase motor. The 12LG has a 1 H.P. motor for 6"x1" grinding wheel and weighs 28 pounds. The 18LG 1½ H.P. 7"x1½" wheel grinder weighs 33 pounds. Delivery on 12LG from stock.



Type BDG
10", 12" and 14"
Grinder

The STANDARD ELECTRICAL TOOL Co.
CINCINNATI · 4 · OHIO
1207 RIVER ROAD

HERE'S PROOF



Here's a specific example of just *one* of the economic benefits available to modern foundrymen who x-ray pilot castings.

CUT COSTS? Certainly—based on information provided by x-ray examination, Auto Specialties Manufacturing Co., St. Joseph, Michigan, recently redesigned its molds for a casting that had to be sound in every respect.

HERE'S WHAT HAPPENED: In the pilot casting, the weight of the mold metal was 90 pounds and 45% of the weight was in the sprue and runner.

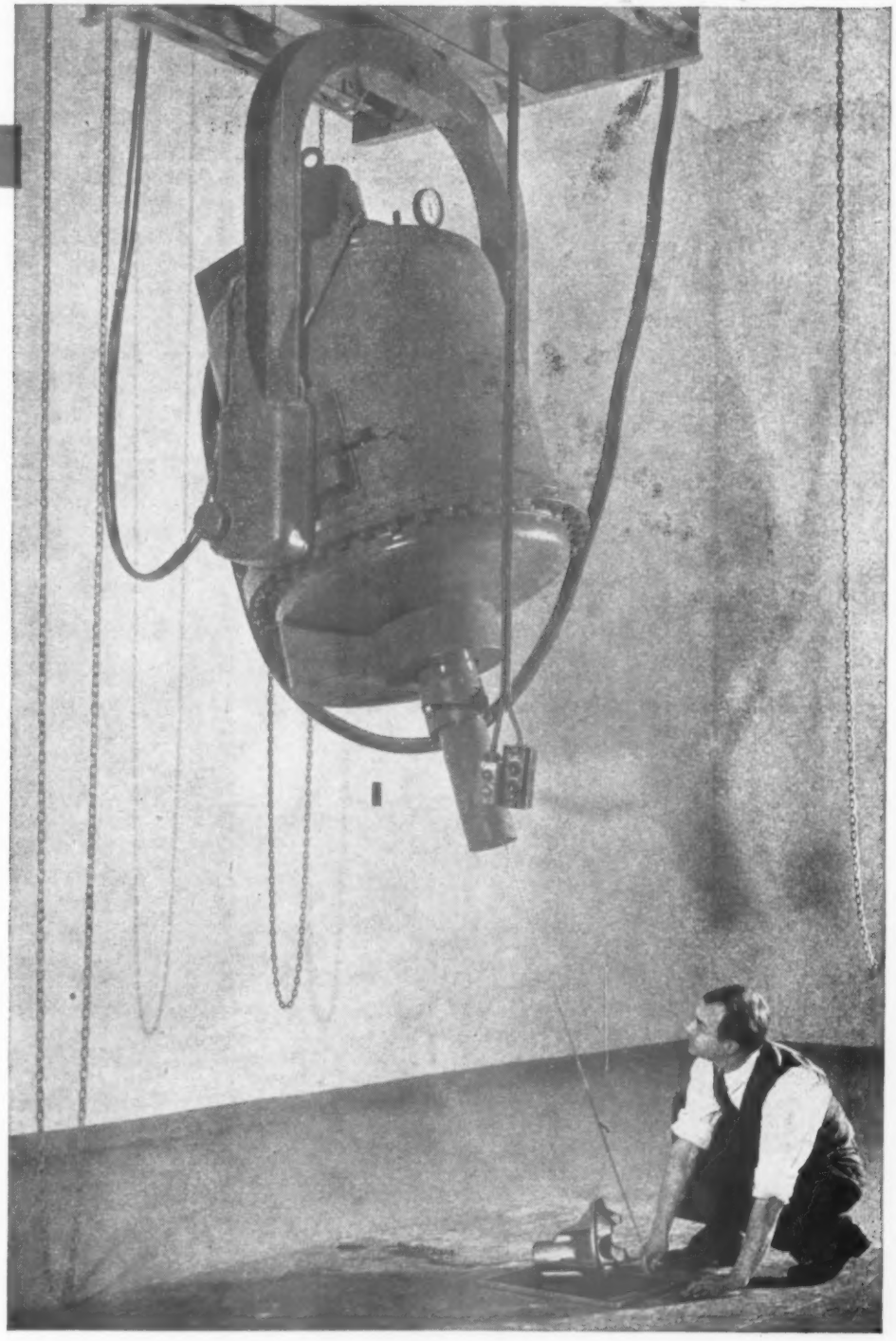
Guided by x-ray findings, the casting was redesigned. The casting was improved and the foundry *saved* 5½ pounds of metal on each unit. Shown above is a comparative photograph of the sprue and runner. Compare the top unit with the bottom one and you can see for yourself how x-ray helps cut foundry costs and increase production.

INCREASED YIELD is important to every foundryman. And x-ray can point the way. It shows how gates and risers can be redesigned to insure continuity of internal metal and, at the same time, effect important economies in the amount of metal poured for each casting.

There are sound reasons why the majority of the nation's leading foundries who use x-ray have selected General Electric X-Ray Industrial Equipment. Our more than 25 years' experience in applying x-ray to industrial problems has resulted in a complete line of x-ray units having transformers, tubes, controls and mountings all designed expressly for industrial service.

The recommendations of G-E X-Ray's Industrial Sales Engineers are based upon their experience gained through long association with all branches of industry. You can rely on their recommendations. Their services are yours for the asking. Write or wire, today, to General Electric X-Ray Corporation, 175 Jackson Boulevard, Chicago 4, Illinois. Address Department 2624.

X-RAY CUTS FOUNDRY COSTS



Auto Specialties Manufacturing Co., St. Joseph, Michigan, has equipped its Industrial X-Ray Laboratory with a G-E X-Ray Million-Volt Industrial Unit (shown here) and a G-E X-Ray OX-220 Unit. Their experience proves that the economic advantages of high-voltage x-ray examination are not limited only to multi-ton, complicated cross-section castings. It also pays off on small castings of relatively simple shape.

GENERAL ELECTRIC X-RAY CORPORATION

LASTS LONGER... WITH LESS AIR

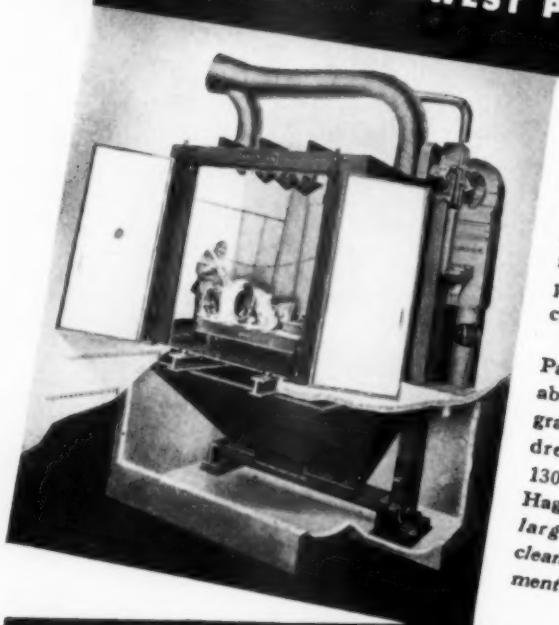
1300 hours is the guaranteed service life of the Pangborn Norbide* Nozzle used with metal abrasive. Such long life is due to a liner that is made of boron carbide — the strongest, hardest, most abrasive-resisting substance ever made for commercial use.

Air consumption is reduced 10 to 20% as compared with iron nozzles and blasting efficiency is improved because stream contour and abrasive velocity are maintained.

No other nozzle will out-perform a Pangborn-Norbide. Pangborn Corporation, 1300 Pangborn Boulevard, Hagerstown, Maryland.

*Trademark of Norton Co. for boron carbide

NOW... MEDIUM AND LARGE METAL PARTS CLEANED AT LOWEST POSSIBLE COST



From a simple enclosure to retain dust and flying abrasive, the blast cleaning room has evolved into Pangborn's mechanical system for high-production, low-cost metal cleaning.

Catalog 400 describes such Pangborn features as mechanical abrasive recovery and pneumatic gravity abrasive separation. Address Pangborn Corporation, 1300 Pangborn Boulevard, Hagerstown, Maryland — *world's largest manufacturer of blast cleaning and dust control equipment.*

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

(*Continued from page* 196)

representatives of the Employers' Association of North Jersey, New Jersey State Chamber of Commerce, Newark Chamber of Commerce and the National Industrial Council.—*Ben K. Price.*

Western New York

APPROXIMATELY 62 members attended a divided meeting of the Western New York Chapter of the AFA at Hotel Touraine, Buffalo, Feb. 7. After the general meeting the gray iron group heard Tom E. Barlow, research engineer, Battelle Memorial Institute, Columbus, O., speak on "Cupola Control and Operation." Members interested in steel and nonferrous metals heard Michael Bock II, metallurgical engineer, Unexcelled Chemical Corp., Cambridge, Mass., discuss "New Methods of Gating and Risering."

At the gray iron session Mr. Barlow suggested some factors which might be taken into consideration to obtain uniform conditions in daily operation of the cupola. In his opinion the bed should be measured not only by its height but also by the length of time it has burned, and for correct comparison it should be measured each day at the same time after being lighted. The bed height is also affected by the burned lining and this should be considered.

Air is one of the principal materials entering the cupola, and Mr. Barlow recommended checking that the proper amount is being used where it is required. The wind box should be inspected to make certain that some tuyeres are not getting more than their share of air at the expense of the others. If blower efficiency is to be maintained it should be protected from dirt and dust, and the piping to the cupola should be installed correctly.

Mr. Barlow's remarks were followed by a general discussion covering many phases of current practice. Ed Burke, Hanna Furnace Corp., was chairman of the session—*Henry C. Winte, chapter chairman.*

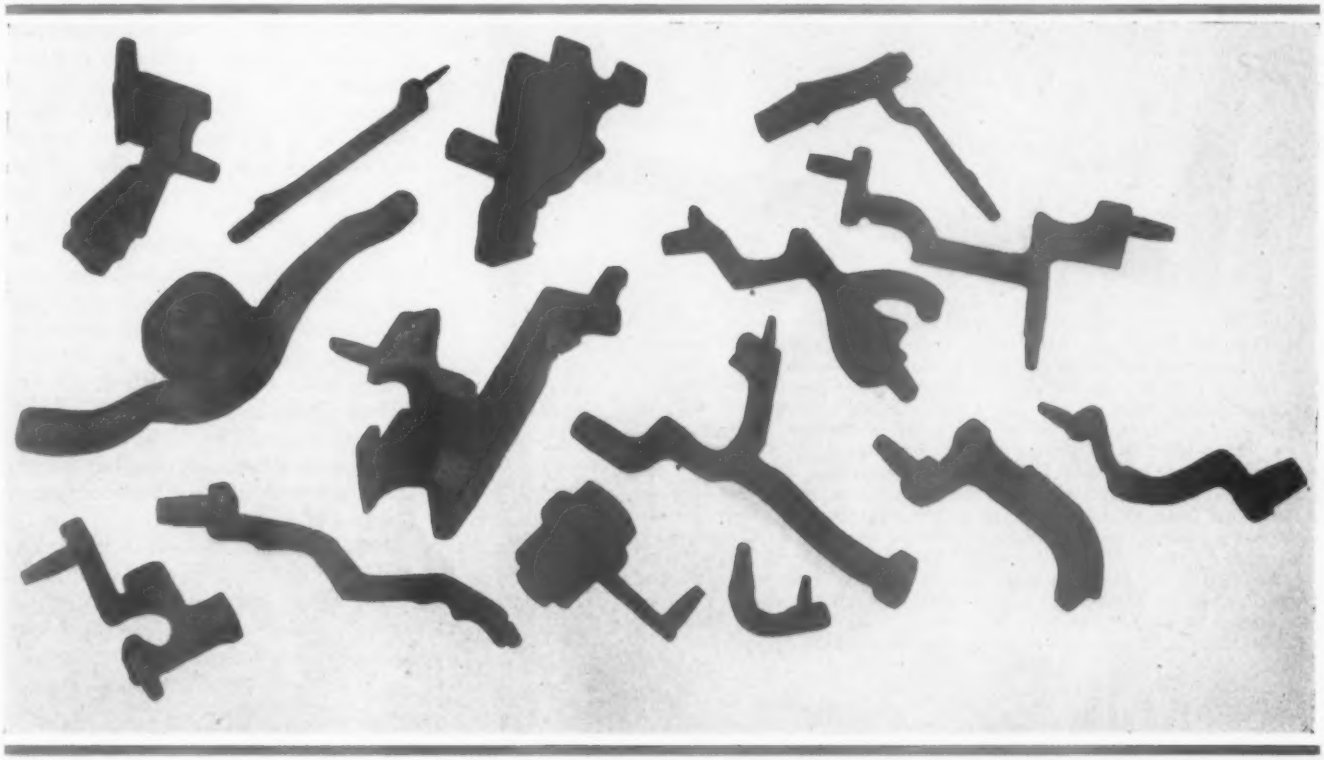
* * *

At the steel and nonferrous meeting Mr. Bock's discussion, illustrated by the use of slides, dealt particularly with the shrinkage in castings of all metal types, which is one of the most troublesome defects encountered in present-day foundry practice. The problem of shrinkage coupled with the attempt to obtain as high a percentage of yield of good castings to metals melted as possible has resulted in many of the recent developments in gating and risering techniques of the metal casting industries. One of the main points brought out was the timing after pouring for application of hot top material.

He also dealt briefly with the use of

(*Continued on page* 202)

SAVE TIME AND MONEY
WITH
PROPER EQUIPMENT



These odd shaped cores are produced by means of core boxes of two piece construction for maximum production on a cartridge, bench type, core blowing machine, with sturdy driers designed especially for ease of handling and minimum core oven space. All core boxes blow tested before leaving our plant. To enjoy the best results from your foundry and core room consult us for the proper pattern and core box equipment.

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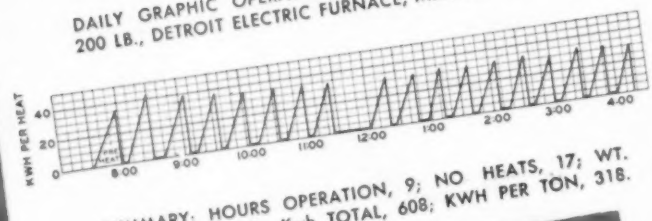
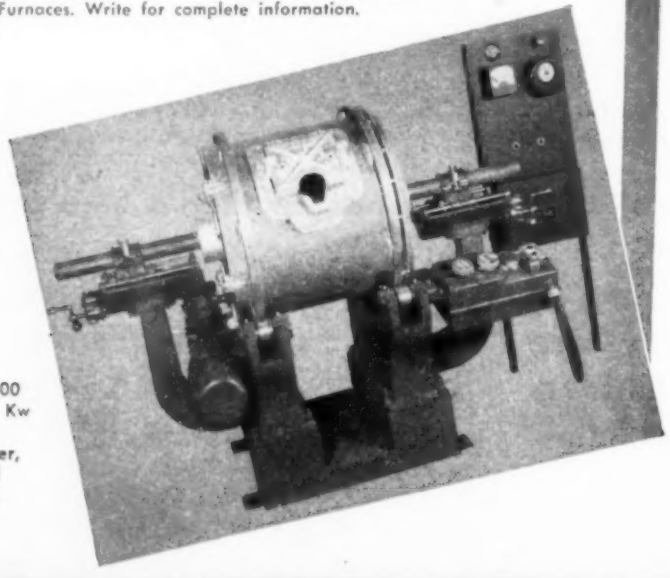
Operating Record in melting of Red Brass reveals production efficiency



Simplified in construction, more compact in design, the new type LF, 200 lb. Detroit Rocking Electric Furnace illustrated below will speed production melting of ferrous and non-ferrous metals in your foundry at reduced cost. In a typical day's operation, this modern furnace melted 17 heats of red brass—225 lbs. per heat—in 9 hours. That's 3825 lbs. of superior quality metal produced with clock-like precision throughout the day with a total overall energy consumption of only 318 Kwh per ton. Power is brought in to the electrodes from either above or below by copper conductors to the stationary pedestal type supports of the non-rotating electrodes. Interchanging of furnace shell involves only the withdrawal of the electrodes allowing the shell to be lifted since there are no detachments to be made. Base mounted electrode brackets, complete with meter panel and contactor box, provide a clear, untrammeled working area for the operator who has all controls at his fingertips. For faster, cleaner production of castings of superior quality in your foundry, depend on Detroit Rocking Electric Furnaces. Write for complete information.



New type LF, 200 lb. capacity, 75 Kw Detroit Electric Furnace for faster, more economical foundry melting.

DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

(*Continued from page* 200)

gypsum insulating sleeves in the molding of nonferrous castings.

Most of the group participated in the lively discussion which followed Mr. Bock's talk.—*M. J. O'Brien, group chairman.*

Philadelphia

AN OVERFLOW crowd attended the Feb. 14 meeting of the Philadelphia Chapter of the AFA at the Engineer's Club to hear Harry H. Kessler, foundry operations manager, Sorbo-Mat Process Engineers, St. Louis, speak on "The Gating and Risering of Iron Castings."

Mr. Kessler presented many interesting points in various gating and risering systems and created a lively discussion on modern trends in the direction of standard practices in the casting of ferrous metals, recommending different types of skim and dam gates for practically all types of castings in order to produce quality castings and prevent heavy scrap losses in the foundry.

The subject of over-risering was discussed at length and many members present showed a lively interest in this expensive practice, as most foundries, today, are using their best efforts to obtain a higher yield of good castings per ton melted. However, Mr. Kessler stated that great care should be taken in reducing risers as an increase in scrap castings in the foundry should not be accepted in lieu of a higher yield.

F. G. Sefing, International Nickel Co. Inc., New York, acted as technical chairman and did his usual fine job in that capacity.—*H. V. Witherington, publicity chairman.*

Canton

PRIOR to their dinner meeting on Feb. 20 at Canton, O., all foundry members of the Canton District Chapter had received a blueprint of a cylinder head which they were to study and arrive at the meeting prepared to discuss making a sound casting, and to estimate the cost of production of 50 such castings. With brass, steel and iron foundries taking part, much lively discussion followed.

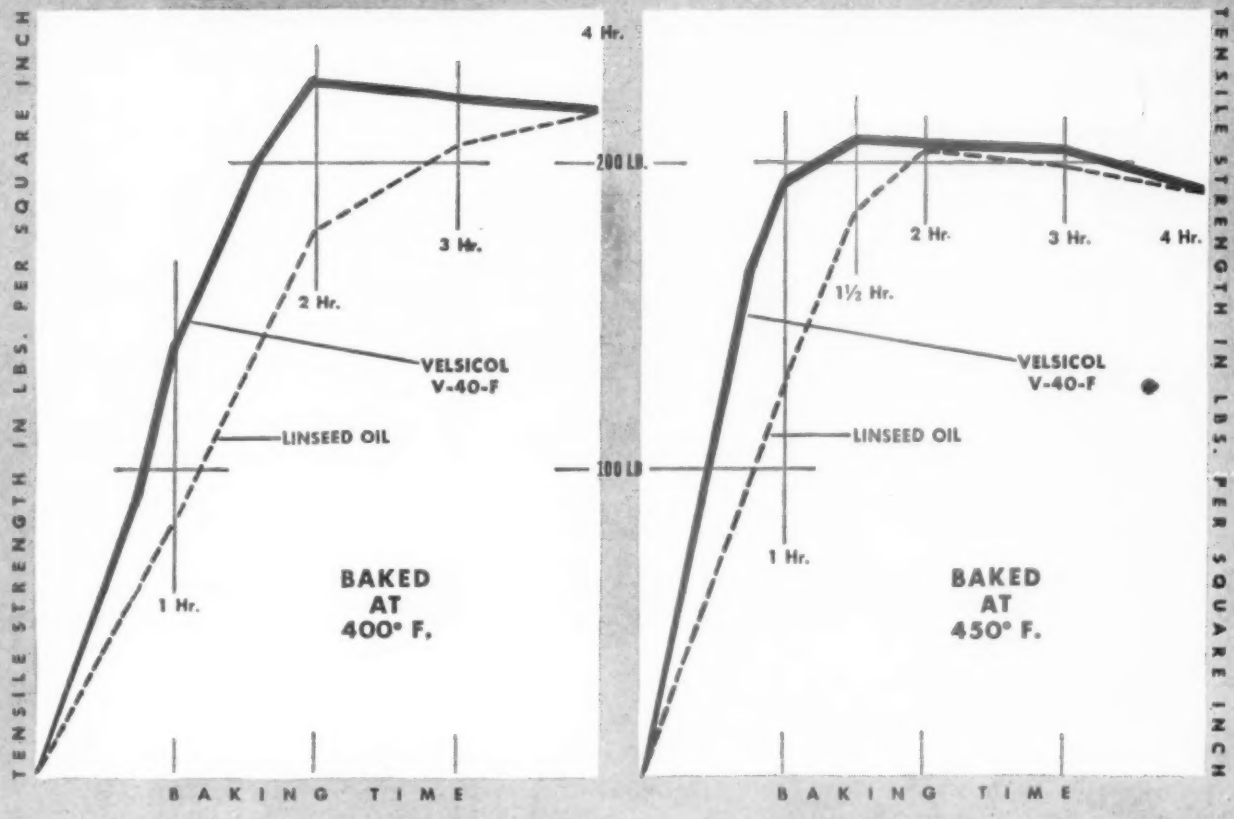
Karl F. Schmidt, United Engineering & Foundry Co., Canton, spoke on the apprentice training problem. He pointed out the need for revival of pride of craftsmanship in foundry work and the necessity of teaching a foundry worker to know his particular job and its importance in the foundry business. He urged foundries to be receptive to new methods in order to increase efficiency and improve the product.

The Industrial Metallurgical Institute

(*Continued on page* 206)

Greater TENSILE STRENGTH

WITH **VELSICOL** *Coresin* **CORE OILS**



Velsicol Light Color Coresin Core Oils offer the biggest dollar value in core oil history.

The above curves show the comparison in tensile strengths and baking speeds of Velsicol V-40-F core oil and raw linseed oil at baking temperatures of 400° F. and 450° F. The sand mix is 50 mesh washed and dried, rounded grain silica sand with 1% by weight of core oil and 2% water.

Velsicol V-40-F works exceptionally clean in the core boxes with no trace of oxide film formation or sticking. This light-colored petroleum hydrocarbon synthetic resin based core oil was especially designed for use in sand mixes for core blowing machines and is unexcelled in this application. This workability is appreciated by coremakers who make cores by any method.

For smooth, strong cores with good collapsibility and low gas content and a maximum of sound clean castings, use Velsicol's uniform, dependable V-40-F Coresin Oil in your core room.

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2 Outstanding Norton RESINOID WHEELS...

Two wheels that give you both a fast, smooth cutting action . . . and long life !

B-5

INTRODUCED a little over a year ago for wheels in the soft and medium hard range, B-5 resinoid bond has been a tremendous success. Operators like the Norton B-5 wheel because it stays sharp—cutting fast and smooth. And grinding costs are down because the fast cutting action is obtained without sacrifice of wheel life. B-5 bond produces a wheel that is mechanically strong and thereby long-lasting.

B-7

THIS newest Norton resinoid bond brings to wheels in the hard grades the same combination of fast cutting action and long life which has made B-5 so popular in the softer grades. A stronger and more heat-resistant bond, B-7 is showing remarkable cost-cutting ability on floor stands, swing frames and portable grinders.

Available with all Norton abrasives for foundry wheels, these two outstanding Norton resinoid bonds are bringing lower grinding costs to cleaning rooms everywhere. Call in your Norton abrasive engineer, or the abrasive specialist of your Norton distributor, for specific recommendations.

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STEP-UP PRODUCTION!
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Cutting sprues and gates on non-ferrous castings becomes a one-man operation with this machine. What's more, a skilled operator isn't needed. Any workman can learn to run the Milwaukee at top capacity in a short time.

It results in a fast, steady flow of work through the cleaning department; accumulations of unfinished work are eliminated, less storage space is required because castings are trimmed and cleaned as they come from the foundry.

With the Milwaukee, ONE SWIFT, SURE STROKE clips gates or sprues in a matter of seconds; slow, tedious hand labor is eliminated, manpower released for more important work.

All models of the Milwaukee-Tessmer Sprue Cutter are fully described in a New Illustrated Bulletin. Write for your copy.

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(*Continued from page* 202)

of Canton, a course of study in practical metallurgy, was described for chapter members by Charles Shelton, Timken Roller Bearing Co. This school was recently organized by Timken metallurgists to teach practical metallurgy.

I. M. Emery, Massillon Steel Castings Co., Massillon, O., and chapter chairman, presided at the business meeting.—*Nils E. Moore, chapter reporter.*

St. Louis

CHANGE in meeting place of the St. Louis District Chapter of the AFA to the York Hotel, St. Louis, Feb. 13, apparently served to help stimulate interest supplementing the keen advance interest manifested in the talk scheduled by Tom Barlow, Battelle Memorial Institute, Columbus, O.

Tom Ross, chairman of the apprentice training committee, outlined the preconvention apprentice competition and described the prizes to be awarded. The coffee talk was made by Charles E. Hoxie who spoke on "Lost Mines."

"Practical Inoculation of Gray Iron" was the subject of Mr. Barlow's address. He stated that the industry must learn to control variables in foundry methods and materials if it is to achieve consistency in its product. Control of iron does not stop at the cupola; mold and core conditions must be correlated since often they are responsible for poor castings.

He went on to say that the chill test is a valuable control medium for the gray iron foundry, because, although it will not disclose composition, it will show the condition and machining characteristics of the metal. Mr. Barlow described the method and materials used in inoculating gray iron and the effect on metal properties.—*John W. Kelin.*

Quad City

ERNEST KINDT, president, Kindt-Collins Co., Cleveland, addressed the Quad City Chapter of the AFA at its meeting at Fort Armstrong Hotel, Rock Island, Ill., Feb. 17, on "Timely Comments on Pattern Engineering."

Mr. Kindt maintains that the future is very bright for the pattern industry, and that patternmakers, by using machinery and methods which are available to them and by co-operating closely with engineering and foundry departments, can do a real service to the casting industry. He supplemented his talk with a movie showing modern methods and equipment for patternmaking. His talk brought forth some lively discussion which made the meeting very interesting.

(*Continued on page* 208)

FREEMAN DOWMETAL PATTERN PLATES

In Stock for Immediate Delivery

Freeman Dowmetal Plates are uniform in thickness, with a sand-blasted, velvet finish, ready to mount patterns.

LIGHTER—33% lighter than aluminum.

STRONGER—than either rolled or cast aluminum. Tensile strength 40,000 lbs. per square inch.

MACHINABILITY—machines better than any other metal, drills and taps easier than aluminum.

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COST—no more than rolled plates or many cast plates.

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"Know Your Dust," says Buell. 999 times out of a thousand, the percentages of various micron sizes establish a complex separation problem. To anticipate satisfactory separation you must know with just what efficiency your collection apparatus will handle each of the different size particles present.

A Buell Fractional Efficiency curve will tell the complete story. Not a round-figure overall promise, but an analytical certification of performance on each of the sizes of your total dust.

Buell engineering can tailor equipment to your most exacting demands. And, instead of being complex, the layout will be relatively simple, the diameters relatively large – and draft demand and maintenance costs low.

The Shave off is the pay off—a van Tongeren System patented feature found only in Buell equipment. The how and why of it is graphically presented in a reference catalog every interested engineer should read. Write for "The van Tongeren System of Industrial Dust Recovery", Buell Engineering Co., 14 Cedar Street, New York 5, N. Y.

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Engineered Efficiency IN DUST RECOVERY

(*Continued from page* 206)

Just before Mr. Kindt's talk, the group was entertained by Gary Carlson, 11-year-old son of Harold Carlson, core room foreman, Frank Foundries Corp., Moline, Ill. Master Carlson played some fine music on the marimba, which he plays professionally.—*C. R. Marthens, secretary-treasurer.*

Cincinnati

REGULAR meeting of the Cincinnati Chapter of the AFA was held Feb. 10 at the Engineering Society headquarters. Seventy-five members were present for the dinner; 150 attended the meeting. Ernest Kindt, president, Kindt-Collins Co., Cleveland, spoke on "Comments on Pattern Engineering."

His talk was divided into eight parts: 1. If I were building a new pattern shop. 2. Selection of proper equipment and its most efficient layout. 3. Principles employed in figuring costs on wood and metal patterns. 4. Principles employed in selling patterns and pattern equipment. 5. Proper way to figure draft for patterns, coreboxes and prints. 6. Pattern engineering for green sand molding. 7. Engineering and making of permanent molds. 8. Overhead.

Mr. Kindt spoke generally on these topics, but one of the most interesting points brought out was the part that chemistry and research have played in developing patternmaking practice. New procedures and materials now available may greatly affect future patternmaking —*E. F. Kindinger, secretary.*

Detroit

REGULAR monthly meeting of the Detroit Chapter of the AFA was held Feb. 20 at Horace H. Rackham Educational Memorial. Three round-table discussions were held—gray iron, steel and nonferrous. Following the meetings a buffet supper was served as a fellowship get-together. There were music, singing and door prizes.

At the gray iron session R. G. McElwee, manager, Foundry Alloy Division, Vanadium Corp. of America, spoke on "Cupola Practice Under Material Difficulties." His talk was supplemented with slides and provoked a lively discussion. E. C. Jeter, Ford Motor Co., was group chairman. About 100 attended this session.

A. DeGiulio, consulting engineer in the chemical and metallurgical fields, addressed the nonferrous group on "Copper and Copper Alloy Castings for Resistance Welding Machines." His talk also was supplemented with slides. C. M. Gaebler, Commerce Pattern Foundry & Machine Co., was group chairman. Approximately

(*Continued on page* 210)

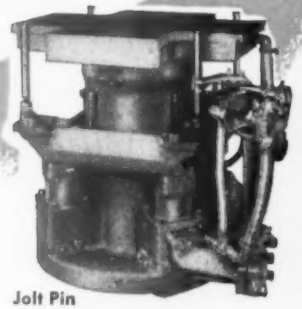
Take Your Foundry Problems to

AFA's "50 PLUS 1" CONVENTION MAY GIVE YOU THE ANSWERS

Have you foundry problems that require solution? Aluminum and magnesium? Brass and bronze? Gray-Iron? Malleable? Pattern-making? Steel and sand? Then be sure to attend the technical sessions at A.F.A.'s 51st Annual Convention at Detroit, April 28 to May 1st. There will be lectures and open discussions covering all important points. Maybe you'll "stump the experts" with your questions, but they'll surely have answers you've been looking for.

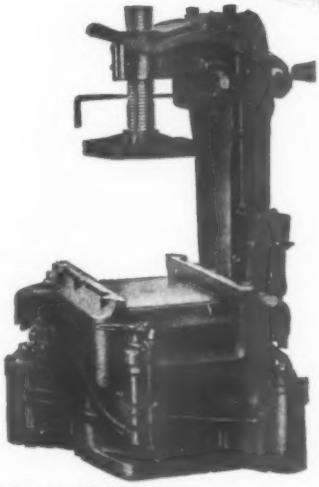
Milwaukee Foundry Equipment engineers will be on hand to welcome and assist you. Everyone is a seasoned foundryman, ready with practical answers to your molding and core making questions.

So make your convention plans — NOW!

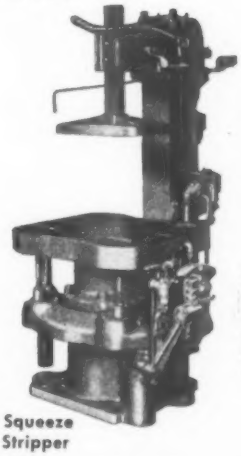


Jolt Pin Lifter

Jolt Squeeze — Portable Ty

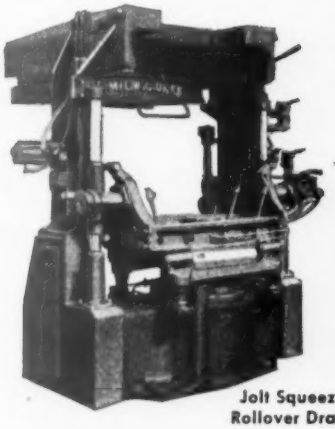


Jolt Squeeze Stripper — Arm Type



Jolt Squeeze Pin Stripper

Jolt Squeeze Stripper — Car Type



Jolt Squeeze Rollover Draw

MILWAUKEE Foundry Equipment Co.

3238 W. PIERCE STREET, MILWAUKEE 4, WISCONSIN, U.S.A.

SOUTHERN CALIFORNIA: Shown, left to right, at the February meeting of the Southern California Chapter. AFA, are: *Standing*—Hal Russill, Eld Metals Co.; William D. Emmitt, Los Angeles Steel Castings Co. *Seated*—Earle D. Shomaker, Kay-Brunner Steel Products; Leo A. Behrendt, Joseph Dixon Crucible Co., the main speaker, L. O. Hofstetter, Brumley-Donaldson Co.

(*Continued from page* 208)

40 attended this meeting.

For the steel session, W. B. Wallis, president, Pittsburgh Lectromelt Furnace Corp., chose as his topic, "The Future Economic Position of the Arc Furnace in the Foundry Industry." He enumerated the problems that arc furnace operators face during the present scrap scarcity in making good steel castings. He discussed new technics that are being developed to produce good steel castings, such as the new procedure of oxygen and air treatment of molten baths. R. J. Wilcox, Michigan Steel Casting Co., was group chairman, and about 50 attended the meeting. —*Charles J. Rittinger, chapter reporter.*

Texas

APPROXIMATELY fifty members and guests attended the Jan. 24 meeting of the Texas Chapter of the AFA at the Blackstone Hotel, Ft. Worth, Tex. A. C. Sinnert, Texas Foundries Inc., Lufkin, Tex., talked on "Foundry Cost Accounting." Mr. Sinnert pointed to the necessity of basic training for the personnel in this work and the need for setting up elemental data based on accurate time studies for the purpose of setting piece work rates. Mr. Sinnert, who is considered an authority on this subject, covered it in a thorough and practical manner as evidenced by the keen interest of the audience and the highly technical and lively discussion following his talk.

A coffee talk by R. G. Naul, Hughes Tool Co., Houston, Tex., entitled "Safe and Good Housekeeping," outlined a suggested plan for inaugurating a clean-up campaign for foundries.—*R. H. Glenney, publicity chairman.*

Chicago

CHICAGO Chapter of the AFA, conducted the third roundtable meeting of the 1946-47 season, March 3, with the gray iron, malleable, steel and nonferrous divisions sponsoring group sessions. The meeting, at the customary location—the Chicago Bar Association, was attended by more than 150.

Chapter President L. H. Hahn, metallurgical supervisor, Sivyer Steel Casting Co., Chicago, presided over the general portion of the meeting and Fred B. Skeates, foundry superintendent, Link-Belt Co., Chicago, and chapter vice president and program committee chairman, handled details of the technical sessions.

With nominations for chapter officers for 1947-48 to be presented at the Apr. 7 meeting, President Hahn appointed a nominating committee consisting of Past President Arthur S. Klopf, works manager, Western Foundry Co.; Walter W. Moore, superintendent, Burnside Steel Foundry Co.; and Harry J. Jacobson, owner, Industrial Pattern Works. Election will take place at the annual meeting May 5.

The gray iron roundtable devoted itself to "Mechanical Charging for the Cupola," with L. D. Reed, executive engineer, Whiting Corp., Chicago, as speaker. A. W. Gregg, executive engineer, foundry equipment department, of the same company, Harvey, Ill., was chairman.

Robert P. Schauss, superintendent, malleable foundry, National Malleable & Steel Castings Co., Chicago, addressed the malleable division roundtable on "Developments in Malleable Metallurgy." W. D. McMillan, chief metallurgist, implement division, International Harvester Co., Chicago, was chairman of the session.

Discussion topic for the steel division was "Sand Control and Binders in Steel Foundries," with Earl E. Woodliff, consultant on sands, Foundry Sand Service Co., Detroit, as the speaker. Presiding as chairman was Clyde Wyman, chief metallurgist, Burnside Steel Foundry Co., Chicago.

J. H. Eckenroad, assistant foreman, nonferrous foundry, Crane Co., Chicago, spoke at the nonferrous division session on "Quality Cores on a Production Basis." H. E. Ferguson, special representative, Acme Aluminum Foundry Co., Chicago, was chairman.

In the gray iron meeting, Mr. Reed described various types of mechanical charging equipment for cupolas, including hoists, cranes, buckets, charging platforms, scales, transfer cars, and the like, and showed slides of a number of installations. It was observed that each plant must be engineered to suit particular conditions involving number, size and location of cupolas, location of stockyard, etc.

An interesting bit of information revealed by Mr. Reed is that shipping of bulk materials, particularly coke and sand, by container cars is winning increased popularity from a number of foundries. Material so shipped can be unloaded quickly and conveniently and, in the case of coke, breakage is minimized, because the 12 containers are lifted out of the freight car by crane and lowered over storage bins. At present, container car facilities are limited because steel shortage prevents their being produced as rapidly as demand warrants.

On Feb. 15, the chapter held its popular annual Ladies' Night party at the Palmer House. The nearly 600 who attended claimed it topped all previous events by a good margin. Heading the committee staging the party were B. A. Patch, district sales manager, Ohio Ferro-Alloys Corp., chairman; S. E. McGinty, sales manager, Firegan Sales Co.; N. L. Mooneyham, sales manager, core oil di-

(*Continued on page* 212)

TWO MEXICAN GRAPHITE PRODUCTS THAT WILL INCREASE PROFITS AND QUALITY IN YOUR FOUNDRY

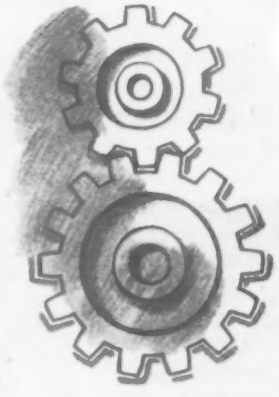
MEXITE BRIQUETTES

SAVE PIG IRON COSTS

Weighing only 4 lbs. each and yielding as much graphitic carbon as 50 lbs. of pig iron, Mexite Briquettes help reduce melting costs by allowing the use of more cheap scrap. Mexite is put in with the steel in high steel charges, and in coke splits when using 100% scrap. Twenty Mexite Briquettes thrown in below the tuyeres when making up the coke bed and four introduced with each ton of metal charged will hold the carbon closer to specifications and act to replace 200 lbs. of pig iron per ton of charge with normal operation.

NO. 8 MEXICAN GRAPHITE

SAVES MACHINING COSTS



If you are pouring light sections and want good machineability, low hardness, and no chilled edges, add 2 lbs. of No. 8 Mexican Graphite to each ton of metal, or less, by trickling at the spout or tossing into the ladle while filling. At a cost of less than 10c per ton, No. 8 Mexican Graphite eliminates the need for annealing and reduces cleaning room and machine shop expense. Write for full information and metallurgical assistance in increasing profitable production in your foundry with Mexite Briquettes and No. 8 Mexican Graphite.

THE UNITED STATES GRAPHITE COMPANY • SAGINAW, MICHIGAN

FOR THAT PARTICULAR JOB

Victor

FERRO PHOSPHOROUS

An alloy containing approximately 75% iron and 25% Phosphorous, prepared in sizes suitable for use in Cupola, Open Hearth and also crushed for ladle additions. For that exacting job—rely on Victor Ferro Phosphorous—100% recovery in most cases!

●

We make every effort to obtain that commodity you want but when we can't supply—perhaps one of the following substitutes may permit you to continue operation—

Spiegeleisen	*Silicon Manganese Briquets*
Ferro Silicon (50% to 90%)	*Chrome Briquets*
Ferro Manganese	*Silvery Pig Iron*
Ferro Chrome	*SMZ Alloy*
Silicon Briquets	*CSMZ Alloy*

COKE—COAL

For cleaning castings faster, use "NATIONAL" SHOT GRIT

WE'LL BE SEEING YOU AT THE A.F.A. CONVENTION DETROIT

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CHICAGO · DETROIT · CINCINNATI · ST. LOUIS · NEW YORK
CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS

(*Continued from page 210*)

vision, Velsicol Corp.; and H. E. Cullen, director of recreation, South Works, Carnegie-Illinois Steel Corp., secretary. —*Erle F. Ross.*

Northeastern Ohio

AN interesting double bill was presented on the program of the Northeastern Ohio Chapter of the AFA at the Feb. 13 meeting at the Cleveland Club.

For convenience in presentation of the program, the audience was divided into two groups. One group remained in the regular meeting room to see and hear items connected with magnesium and aluminum. The second group in an adjoining room heard a discussion on various phases of the patternmaking industry. M. E. Brooks of the Dow Chemical Co. Bay City, Mich., supervised the presentation of a swiftly moving picture showing methods and equipment employed in the production and fabrication of magnesium.

A somewhat similar picture dealing with aluminum was presented by L. W. Davis, Central Metallurgical Department, Aluminum Co. of America, Cleveland. A limited number of the items showed scenes in the foundry, but the majority dealt with rolling, welding, machining, extrusion and other features connected with the production of the almost endless shapes in which aluminum is used in the household and industrial fields. Questions presented after the movies were answered by Mr. Davis and Mr. Brooks.—*Pat Dwyer.*

° ° °

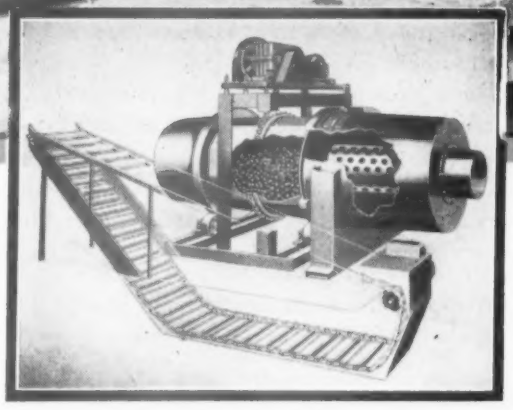
ABOUT 60 members of the patternmaking division, Northeastern Ohio Chapter of the AFA, attended the panel discussion at the chapter's Feb. 13 meeting. Panel discussion leaders were: Charles Wilberschied, Master Pattern Co.; Ernie Klippstein, New Age Woodcraft Co. and Ed Pierie, Motor Patterns Co., all of Cleveland.

Mr. Wilberschied spoke on "Gadgets," commenting on motor tools such as portable and fixed routers, corner rounders, portable sanders and air and electric grinders.

Mr. Klippstein, speaking on "New Methods for Old Machines," discussed time-saving methods in wood patternmaking and described the cutting of worms and teeth on gears with a band saw.

Mr. Pierie spoke on glues and stated that a glue is only as good as the wood used. Hot glue, either hide or bone, according to Mr. Pierie, is not as moisture resisting as cold glue, and it does not affect woodworking tools. It must be kept heated between 140 and 150 F to

(*Concluded on page 214*)



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WET CLEANING MILLS

Automatic Star Return

SPEEDY . . 12 MINUTES PER BATCH*

GENTLE . . NO NICKING, NO MILL WEAR

ECONOMICAL . . SAVE 30% TO 70% ON CLEANING COSTS

NOT SELF-DESTRUCTIVE . . CUT THOSE MAINTENANCE COSTS

NO MANUAL HANDLING OF STARS . . CLEANING MEDIUM HANDLED *AUTOMATICALLY*

* ***Machine is cleaning plow shares at the rate of 40 batches in 8 hours or 12 minutes per batch, in this RANSOHOFF END-LOADING, END-UNLOADING MILL.***

AND MANY MORE REASONS

Why You Should Ask
THE RANSOHOFF ENGINEERS
To Talk Over Your Cleaning Problems

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Announcing

THE NEW UNI-WASH SHAKE-OUT BOOTH

COMPACT— COMPLETE— A PRE-ASSEMBLED UNIT!

THE Uni-Wash Shake-Out Booth is a self-contained unit—*delivered pre-assembled, ready to bolt to the floor.* These economical units will effectively collect, purify and distribute air permeated with dust and fumes from shake-out, core knockout, shaker screening, mold conveyor and pouring operations. And in addition, the intake suction is sufficient to carry away much of the hot air blast from such operations.

The Uni-Wash Shake-Out Booth is a profitable foundry investment, producing cleaner, more healthful air and greater production efficiency at low cost.

Consider These Benefits—

- 90% installation time and cost eliminated.
- 5 standard sizes—5000, 7500, 10,000, 12,500, and 15,000 CFM—used individually or in combination.
- Conveyor removes sludge automatically . . . reduced maintenance.
- Long, low cost operation . . . one moving part.
- Lower initial cost than any other system of comparable capacity.

Then SEND FOR CATALOG CONTAINING COMPLETE DETAILS ON CONSTRUCTION, OPERATION AND APPLICATION.

Established 1912

NEWCOMB-DETROIT COMPANY

5741 Russell Street • Detroit 11, Michigan

(*Concluded from page 212*)

maintain its adhesive powers.

The speaker's discussions brought much comment from the group. Frank Cech, Cleveland Trade School, served as moderator.—*Robert H. Herrmann.*

Pittsburgh

PITTSBURGH Foundrymen's Association's February meeting, held at the Fort Pitt hotel on the 17th, dealt with the subject of safety in the foundry. The guest speaker was Ralph M. Meigs, assistant vice president of the loss prevention department, Liberty Mutual Insurance Co., Boston. A safety film, loaned by Western Pennsylvania Safety Council, was shown in conjunction with the oral presentation.

Mr. Meigs stated that the foundry industry has an accident occurrence rate considerably higher than that reported from most manufacturing operations and that it has a job to do in pushing the high frequency figure downward. He stressed the following four factors: 1. Creating a broad conception of the value of accident prevention; 2. Organizing to produce accident prevention; 3. Tackling materials handling; and 4. Housekeeping.

Manpower must be available to carry on an accident prevention program. Each person involved should understand that his work in the program is a significant portion of his duties and will require a definite share of his time and effort.

Safe working conditions are primarily concerned with tangible physical conditions which can be approached as an engineering proposition. Establishment of safe practices is much more involved; it might be described as an undertaking in human engineering. Safe practices, therefore, fundamentally are concerned with the creation of patterns of thinking to build up defenses against callousness and lack of understanding.—*Joseph C. Sullivan.*

Central Illinois

GUEST speaker of the Central Illinois Chapter of the AFA meeting Feb. 3 at the Jefferson Hotel, Peoria, Ill., was C. E. Bales, vice president, Ironton Fire Brick Co., Ironton, O.

Speaking on "Modern Foundry Refractories," Mr. Bales, through the use of slides, conducted members present on a tour through the Ironton Fire Brick Co.'s modern refractory manufacturing plant. His capably presented talk on refractories brought forth a lengthy discussion which had to be limited so that the meeting could be adjourned at a reasonable hour. —*G. H. Rockwell, secretary-treasurer.*

Charles Morris Merrick, inventor, founder and first president of The Standard Horse Nail Corporation.

1872 1947

75 YEARS OF CONTINOUS SERVICE

STANDARD HORSE NAIL CORPORATION
CHILL KOOLHEAD NAILS
COLD FINISHED HOT FORGED

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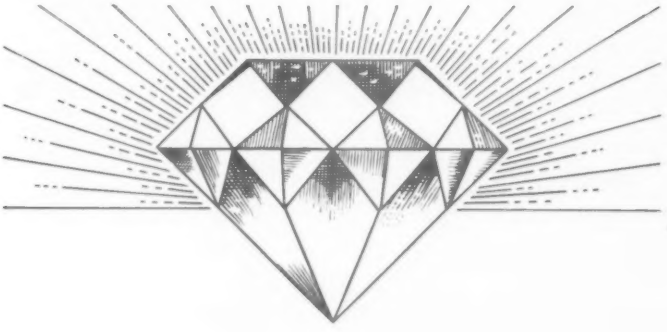


In this, the year of our Diamond Anniversary, our thoughts turn to Charles Morris Merrick, the tireless inventor who founded this company after spending 15 years perfecting automatic hot-forging and finishing machines for the manufacture of horse shoe nails. Today we use the same exclusive process that he invented. 40% of the company's capacity is devoted to the manufacture of horse shoe and foundry chill nails, and for three quarters of a century our products have been used all over the world. Thanks to our founder, we have an exclusive manufacturing process; thanks to our management, we have an excellent product; thanks to the foundry industry, we have a discerning market; thanks to our officers and policies, we never had the remotest suggestion of a strike. Because of these reasons, we are proud to celebrate our Diamond Anniversary.

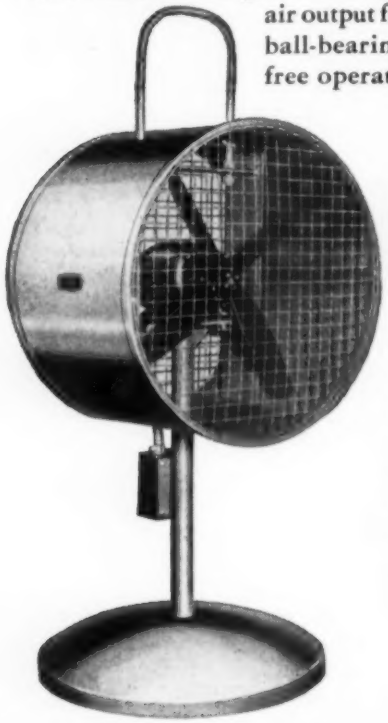
STANDARD HORSE NAIL CORP.

New Brighton, Pennsylvania

PRODUCTION CLIMBS with the *BREEZE!*

● Speed production with these versatile, *portable* Propellairs. Bring fresh air in—blow away smoke, dust, heat, or moisture. Quickly moved; placed anywhere. Effective for men, machines, or products. Heavy wire guards give *complete* protection. Extremely valuable supplements to regular ventilating systems.

Efficient airfoil-section blades *pull* as well as *push* the air. Scientific variations in pitch, curvature, and thickness produce uniform air output from *entire* fan area. Totally enclosed, ball-bearing motors for continuous, trouble-free operation.

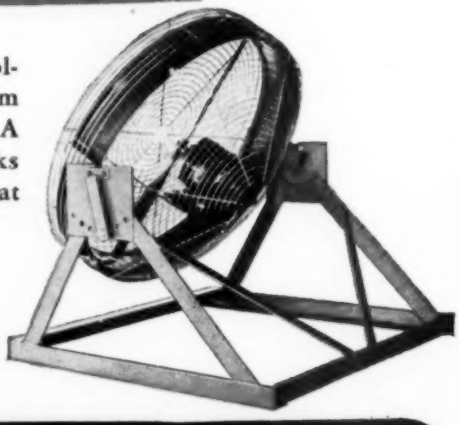


PROPELLAIR PORTABLE PEDESTAL FANS

Rugged welded-steel construction throughout. Extra-heavy materials. Low maintenance; *virtually indestructible.* Same diameter base as drum prevents overturning. Crane hook for speedy moving. Delivers high-velocity air of effective penetrating force. 30″ and 36″ diameters. Capacities to 20,650 c.f.m.

PROPELLAIR PORTABLE CRADLE FANS

Produces high-velocity, high-volume airstream at *any* angle from horizontal to vertical upward. A sturdy, adjustable steel cradle locks fan in desired position. Low, squat mounting for maximum stability. 20″, 24″, 30″, 36″ diameters. Capacities to 20,650 c.f.m.



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PROPELLAIR

DIVISION OF ROBBINS & MYERS • INC.

SPRINGFIELD • OHIO

WISCONSIN FOUNDRY CONFERENCE

(*Continued from page* 168)

surface smoothness, experience has shown that less vibration is required for drawing and perfect molds result from an easier draw.

Describing some of the advantages claimed for plastic plates, the speaker referred to low cost, unusual wearing qualities and light weight. Thermal reaction with hot sand does not occur, with resultant elimination of condensation on the plate and consequent stickiness. In practice, an initial light application of parting compound is made after which a self-polishing effect of the pattern plate occurs.

Pattern duplication in plastic is indicated to be economical, and broken patterns may easily be remade in plastic from the pieces at low cost. An interesting possibility occurs, said the speaker, for use of color in patterns—any desired color being possible with plastic. As a "signal" to the molder, certain portions of the pattern might easily be colored to indicate a core print, for instance.

Plastic Patterns Easily Machined

The speaker pointed out that plastic patterns machine readily. Carbide tools are recommended. Runners may be temporarily attached and trial additions to patterns may be made—being subsequently changed over to plastic counterparts. Patching, additions and fillets may readily be added, special plastic material being available for such purposes. In this case, the plastic may be allowed to cure itself or be cured by the application of mild heat such as that from an ordinary light bulb. Repairs may be effected easily and quickly at the point of use.

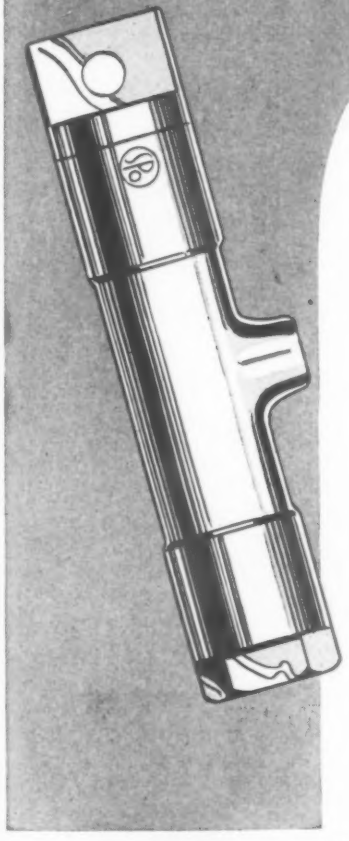
Experience with plastic coreboxes has not as yet been very broad although boxes have been made which handle over 8000 blown cores, and many thousands by hand process. In coreboxes for blowers, fracture of boxes appeared to be the biggest problem, trouble most frequently occurring because the box had not been closed properly. In any event, it seemed indicated that tear rather than wear occurred. When questioned about plastic core dryers, it was said that this possibility is presently being developed.

Describing the physical characteristics of plastic, the speaker pointed out that the use of phenolics requires special techniques since it is a matter of dealing with exothermic heat reactions rather than mechanical considerations. The proper handling of thin and heavy sections is particularly important. Thinnest section recommended is ⅛-in.

(*Continued on page* 218)

"Never Again!

UNDEPENDABLE VIBRATORS ARE TOO EXPENSIVE!"



It doesn't pay to use them—that's sure. It doesn't take much experience to realize that it doesn't pay to repair them, either.

What you put into them is a certain quantity. What you get out of them is an uncertain quantity. It's a poor gamble, with the odds all the wrong way.

Let your maintenance man or molders fix them? Ever try it? You'll soon decide that their time is too valuable to spend on this losing venture. Even if subsequent satisfactory service were assured, the investment wouldn't pay out.

Oh, yes, we *might* clean an old vibrator or replace a spring. Even so, we've decided it's better to let the "old timers" accumulate and then bundle them off to the *factory to be re-conditioned or thrown away. Otherwise, out they go!

*SPO vibrators can be factory-reconditioned.

MEMBER

SPO also builds both molding machines and pattern equipment, and guarantees every job to be in full accordance with your specifications.

SPO

INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

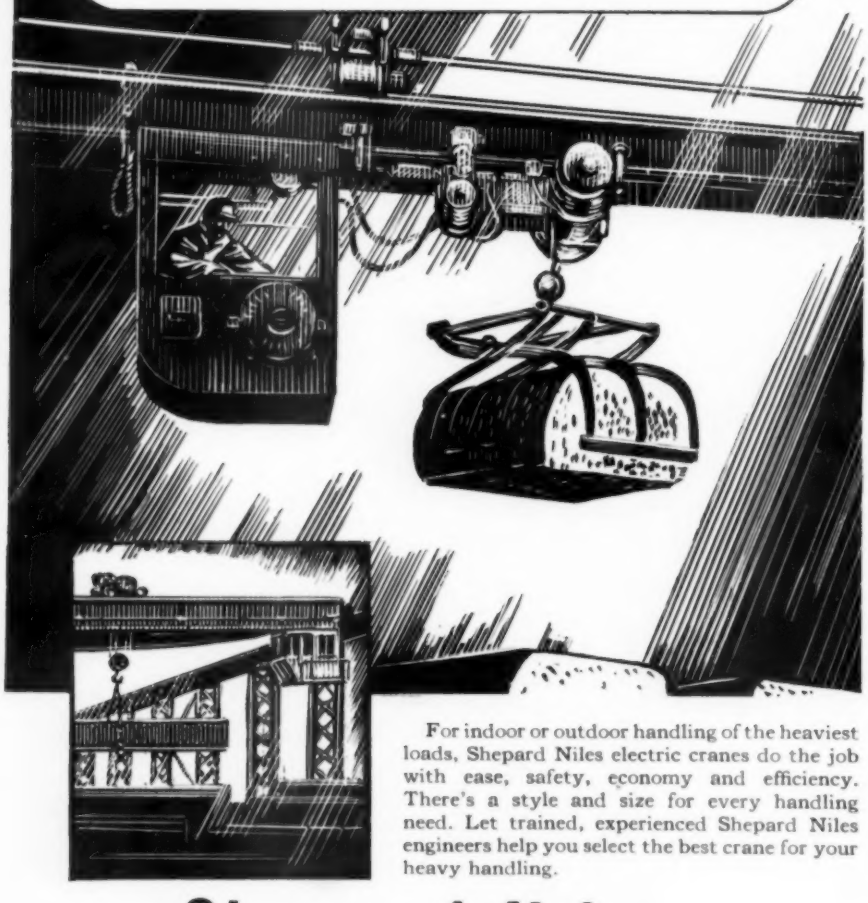
7500 GRAND DIVISION AVENUE • • CLEVELAND 5, OHIO

Need A Railroad In Your Plant?

When you install a Shepard Niles monorail hoist you have your own private railroad to lift heavy loads, move them to other parts of the plant and deposit them where needed.

America's oldest builder of electric hoists and cranes has a style and size of monorail hoist for every handling operation from ⅛ to 20 tons. Trained, experienced Shepard Niles engineers will gladly survey your material handling problems and recommend, without obligation, the best style of monorail hoist to do the job. With over 5,000 styles and sizes from which to choose, there's bound to be one to suit you.

Shepard Niles monorail hoists, whether floor or cab operated, work economically and efficiently, year after year. When a Shepard Niles does the work there's no tired muscles, no absenteeism.



For indoor or outdoor handling of the heaviest loads, Shepard Niles electric cranes do the job with ease, safety, economy and efficiency. There's a style and size for every handling need. Let trained, experienced Shepard Niles engineers help you select the best crane for your heavy handling.

Shepard Niles
CRANE & HOIST CORPORATION
360 SCHUYLER AVE., MONTOUR FALLS, N. Y.

(*Continued from page 216*)

Audience participation in Mr. Salach's discussion of the subject was spirited. He assured the group that no distortion or other damage would be had from allowing a plastic pattern to rest against a hot radiator—that taking a pattern from "cold" storage and putting it in hot sand would have no detrimental effect on the pattern. Effect of hot metal on the pattern was discussed and it was said that there would be no damage to the plastic except after prolonged contact, in which case it would probably char, but would not burn or warp. The charred area could be repaired as previously described. The speaker pointed out also that plastic pattern material does not absorb moisture and resists acids and alkalies.

The question of use of plastic patterns with sandslingers was asked. The speaker stated he did not know of any such use so far but was of the opinion that such use was quite possible. He said that a plastic pattern could be chipped if struck a glancing blow but this he conceived to be an advantage inasmuch as it was probable that a similar blow would warp or distort an aluminum plate.

He concluded by stating that there was no limit to the size of plastic patterns other than oven capacity inasmuch as the material cured uniformly.

Identify Various Defects

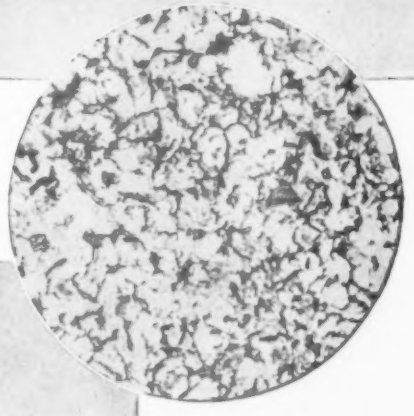
Opening session on nonferrous castings was held Thursday afternoon with A. K. Higgins, Allis-Chalmers Mfg. Co., presiding and William H. Baer, Naval Research Laboratory, Anacostia, D. C., as the speaker. Mr. Baer talked on the "Radiographic Examination of Bronze Castings," particularly with respect to identification of various types of defects. In the investigation some 50 bronze plates 1 x 6 x 8 in. were cast under carefully controlled conditions. The alloy was Navy G containing 88 per cent Cu, 8 per cent Sn and 4 percent Zn. Plates were variously gated to produce specific types of defects such as gas porosity, shrinkage and tears.

Plates were radiographed and then subjected to a pressure test at 250 psi for 15 minutes. Leakers were discarded, and ⅛-in. of metal removed from each side of the remaining plates. Those now ¾-in. thick again were subjected to the same pressure test, and the leakers discarded. Good plates were machined on both sides, reducing the thickness to ½-in. Following the pressure test, those passing were machined to ¼-in. for the final pressure test.

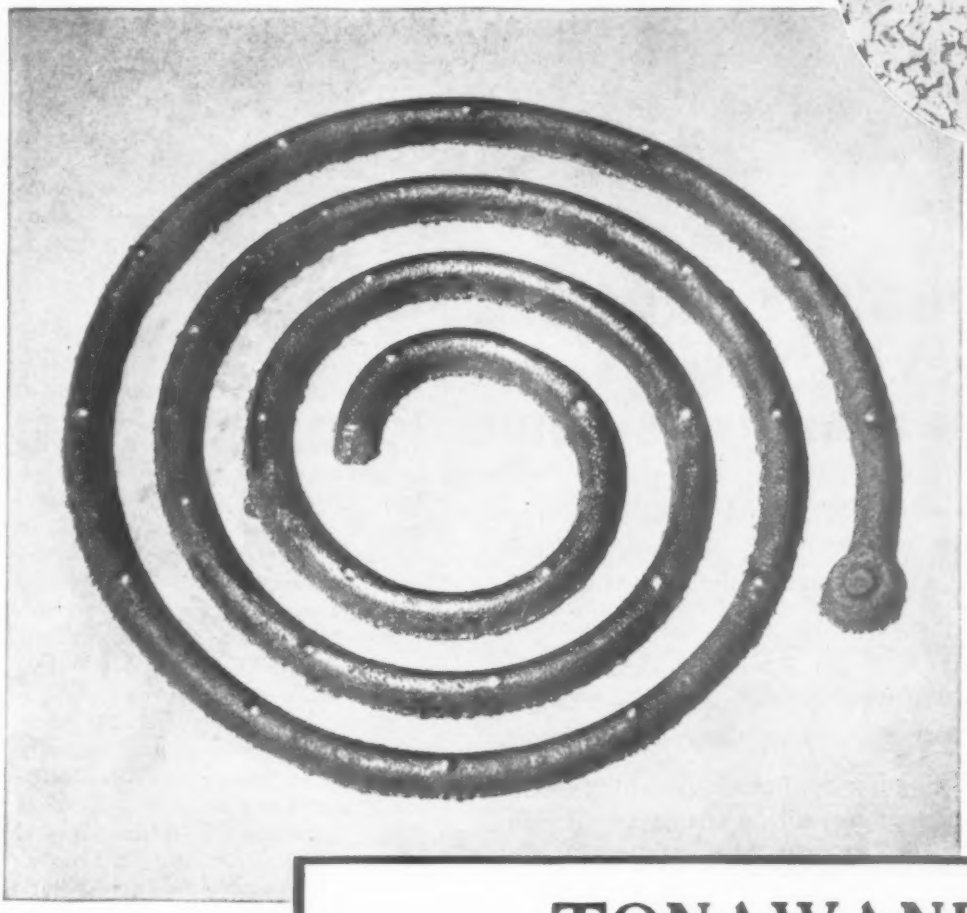
Records were kept of the good castings in the tests, and it was found that of all plates tested at 1-in. thickness 81 per cent were pressure tight. Of those tested

(*Continued on page 220*)

G-IRON* gives you greater fluidity



*G-Iron is graphitized pig iron. The photographs show its grain structure. The photomicrograph (circle, etched, 500 diam.) shows the random graphite evenly distributed. Manufactured under U. S. and Canadian patents.



Standard fluidity test of a G-Iron casting, containing 2.08% silicon, 3.56 total carbon, measures 52 to 59 inches compared with ordinary iron which flows from 30 to 40 inches.

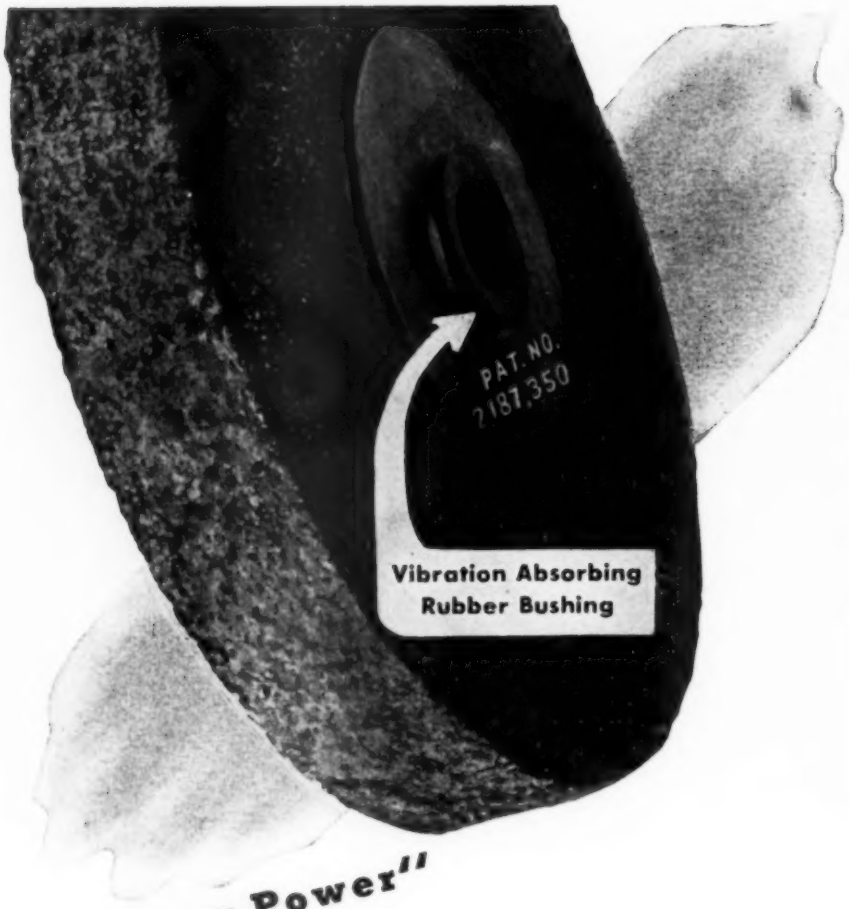
Greater fluidity of G-Iron and reduction in internal shrinkage help solve the problem of casting thick and thin sections without the danger of cold shuts and shrink pockets. Reduces scrap losses.

TONAWANDA
for sound castings

TONAWANDA IRON CORPORATION

NORTH TONAWANDA, N. Y.

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION



"Floating Power"

for PORTABLE GRINDERS

because MANHATTAN V.D.B. WHEELS have the patented VIBRATION DAMPENER BUSHING

Men like them because they reduce fatigue and strain. Freed from the tiresome vibration, chatter or jumping of the grinder in their hands, operators guide the wheels with greater accuracy. More work is done with less effort.

With a Manhattan Vibration Dampener Bushing dissipating wear and tear, you find the wheel lasts longer and the machine lasts longer, too. Maintenance costs go down and the shop shows a better profit.

. . . Big results from a little thing like a vibration absorbing rubber bushing, but a trial and comparison proves how savings are accumulating for present users.

The Manhattan V.D.B. Bushing and Wheel are sold as a unit in straight types up to 8" in diameter. Sold direct by the

ABRASIVE WHEEL DEPARTMENT

RAYBESTOS-MANHATTAN INC.

Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION PASSAIC, NEW JERSEY

(*Concluded from page 218*)

at ¾-in. thickness, 83.5 per cent passed. Plates ½-in. thick showed 68 per cent good, and those ¼-in. thick showed 56 per cent pressure tight. The same plates were classified as to type of defect such as shrinkage and gas porosity. Of 30 plates classified as shrinkage, 90 per cent were pressure tight at 1 in., 70 per cent at ¾-in., 74 per cent at ½-in., and 43 per cent at ¼-in. thickness. Of 19 plates classified as gas porosity 89 per cent were pressure tight at 1 in., 82 per cent at ¾-in., 71 per cent at ½-in., and 60 per cent at ¼-in. thickness.

Mr. Baer said that in some cases, particularly in those plates exhibiting gas porosity, the pressure tightness could not be predicated on radiographic appearance in the 1-in. thickness. In some cases the radiographic appearance indicated considerable lack of soundness, but the pressure test showed otherwise. After machining to ¾-in. thick, the radiograph indicated that the porosity was confined to the surface sections. On others which radiographically were indicated as unsound, the plates were pressure tight at ¼-in. thickness—indicating that the porosity was at the center of the plate. Mr. Baer concluded that considerably more work will be required before radiographic standards can be set up for inspection guides.

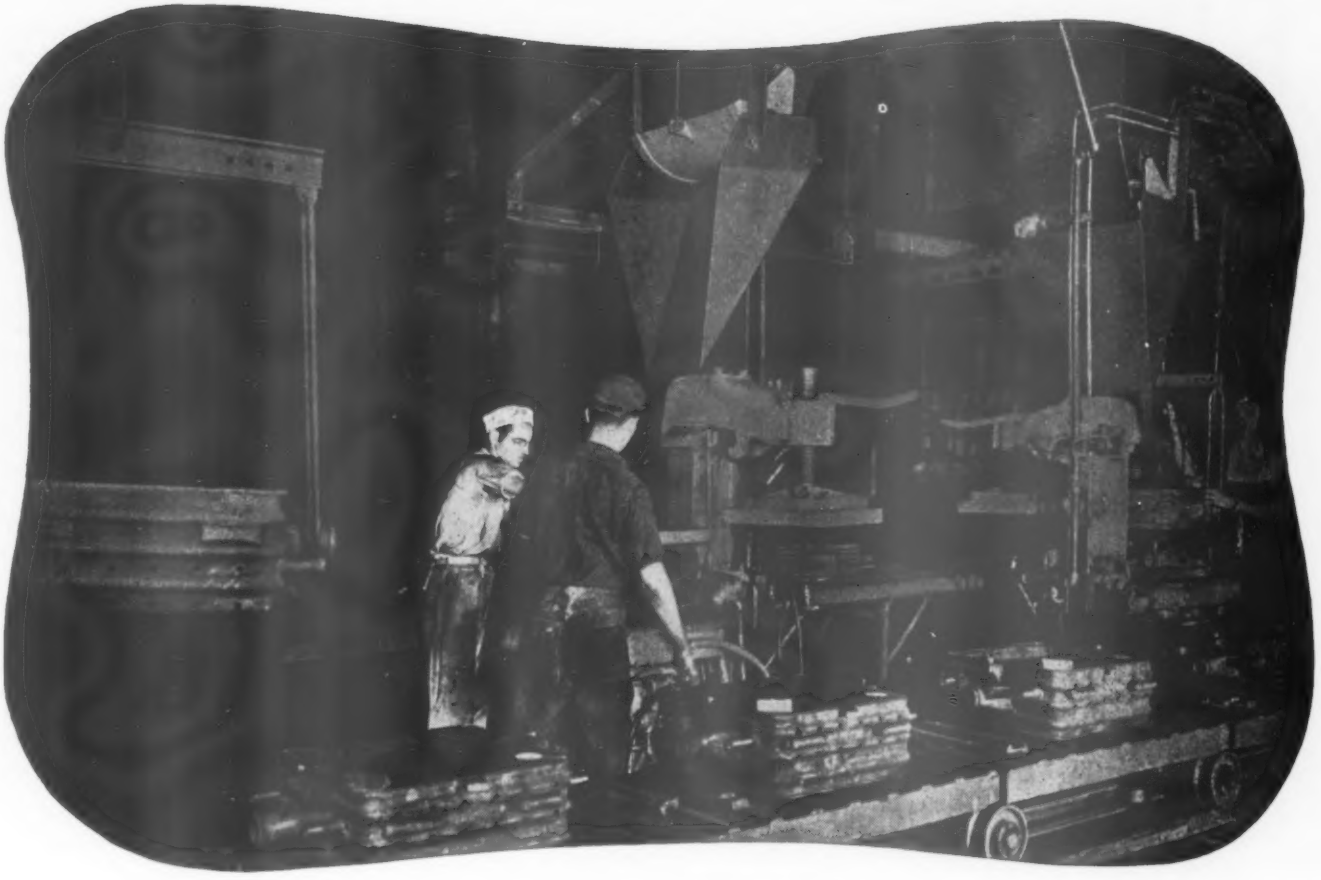
Consider Many Factors

There is no longer any question about the desirability of some degree of mechanization in a modernization program for a jobbing malleable foundry—the major questions are how is it to be accomplished, what type of equipment, how much mechanization is justified economically, and how should it be financed. So stated Lester B. Knight, president, Lester B. Knight & Associates Inc., Chicago, in addressing the first malleable iron session Thursday. Frank Harris, Belle City Malleable Iron Co., Racine, Wis., was chairman.

The mechanization program, the speaker stated, should be planned carefully, adequately engineered and financed without jeopardizing working capital. All of following questions should be answered affirmatively: (1) Does it permit production full time at full capacity with a minimum of effort under good working conditions?; (2) Does it provide adequate controls for highest quality?; (3) Is it designed and built for the service to be performed; and (4) Will it pay for itself in three years or less of operations?

All departments should be kept in balance. All patterns, coreboxes, flasks and production tools should be standardized insofar as possible to permit maximum

(*Concluded on page 222*)



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THE PETERSON

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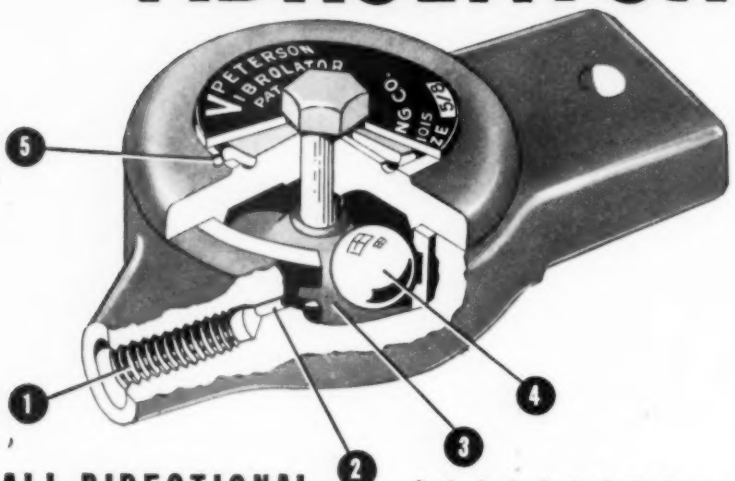

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LONG LIFE . . . .

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Ask your supply house for a demonstration, they will be glad to cooperate.

HOW IT WORKS

1. Compressed air line is attached at this point.
2. Velocity of air is increased as it passes through this venturi.
3. Accelerated air passes through race creating a turbine action within the unit.
4. The steel ball is driven at great speed around the hardened steel race producing a powerful all-directional vibration.
5. Spent air passes outward around the bolt and exhausts through sand excluding exhaust ports under the name plate.

MARTIN ENGINEERING CO.
KEWANEE, ILLINOIS

(*Concluded from page 220*)

production of high castings per unit of effort. Such procedure may increase cost of patterns, etc., initially, but the overall investment will be less, the problem of establishing and administering procedures, price rates (or incentive system) simplified, asserted Mr. Knight.

Successful operation of mechanized foundry is more demanding of good management than a hand-operated shop, the speaker continued. At this point he dealt specifically with mechanization of specific operations, including sand handling, mold and casting handling, etc.

The foundry should recognize the service an inspector can give, declared V. S. Sullivan, inspector, Carterpillar Tractor Co., Peoria, in addressing the second malleable session. Frank Harris continued as chairman. When an inspector criticizes, the speaker said, he is doing it from the customers' viewpoint.

Visual inspection, performed on a long conveyor in the Caterpillar plant, will reveal about 25 defects. Among these are lack of cleanliness which might result in sand in bearings and prevent paint from adhering; blowholes, shrinks and sand holes which affect strength; cope and drag shifts and swells, which can cause machining difficulties because holding fixtures are designed with close limits; etc.

Inspection Reveals Defects

An oil and chalk inspection shows up other defects. The insides of castings are sprayed with a kerosene oil and 15 minutes is allowed for it to penetrate. Fuller's earth is then dusted in and dampness appears around defects. Cracks are located by wiping the oil off immediately and following with dusting.

Mr. Sullivan stated that engineers want strength and ductility in castings. To check for defects which would impair these, x-ray, Magniflux (dry) and Zyglo are utilized. The two former are used only where defects are suspected; the latter is employed 100 per cent on such parts as levers and pedals, which through failure might endanger life, as for example in a tractor.

No welding of malleable castings is permitted by Caterpillar, and neither is peening over cracks. As a matter of fact, no satisfactory salvage of defective castings has been found.

Dimensions of castings are checked by gages and calipers, some designed specially by the inspection department. Mr. Sullivan asserted that the engineer is closing in on the foundry in the matter of dimensions. On a ⅛-in. finish, castings cannot be more than 1/16-in. under size.

(*To be concluded next month*)

59 Years of Know-How are Back of Every ALCOA Ingot

Our experts will gladly give you advice on the proper Alcoa Aluminum Alloy to use for each casting job. Help you solve pattern design and foundry problems. Work with you to make more *good* castings from every batch of Alcoa Aluminum you melt.

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The adventures of BILL

By PAT DWYER

Drawings by RICHEY

ONE night recently, the same being the 17th of March, I heard a man sing "Bendemeer Stream," one the sweetest and most melodious songs written by Thomas Moore about 100 years ago. For some reason unknown to me, I never before had seen in print or heard the words of the song. The music was intimately familiar. It carried me across time and space and I saw myself, a little boy, sitting entranced in a small twisted hay-rope bottom chair, while my father played that same *chune* on a black, silver banded German flute about 3 feet long. Childhood impressions usually are distorted and my memory may be off 6 or 8 inches, but all the king's horses and all the king's men could not induce me or force me to knock off another inch.

My father, over whom the green sod has been resting lightly for many a year, was not a professional musician, but in the language of the time and place he was as fine a flute player as ever cocked a lip. His repertoire apparently was endless and instantly available at his nimble finger tips.

Without a score or a single written note he could rattle off jigs and reels, the music for topical songs of the day, or old songs and ballads from the time of Brian Boru. Whenever or wherever he heard a new tune, he tried it over once or twice and then he had it for his collection. Not only had it, but he improved and adorned it with flourishes trills, runs and grace notes. Many years afterward, while reading Stevenson's *Kidnapped*, I was reminded of this happy gift which some men have with musical instruments. Surely no pipe artist ever surpassed Robin Oig and the swashbuckling, fiery, generous and touchy adherent of the house of Stewart, doughty Alan Breck, whose loyalty to a lost cause and whose sense of personal honor were exceeded only by his bitter hatred of the Clan Campbell.

I never learned to play the long flute. Partly because my father reposed just that degree of confidence in a small boy that wise fathers in all generations have reposed in their youthful offsprings. He carefully kept the instrument out of my reach. Musical instruments cost money in those days. While the family was growing up, the prospect of setting aside enough of the filthy stuff to buy a new flute presented a greater problem than that which confronted Jock McLean, the hielan'mon who came frae Tobermory when he found that his kilt from age and weather had began to creep up around his hurdies to leave him partly exposed.

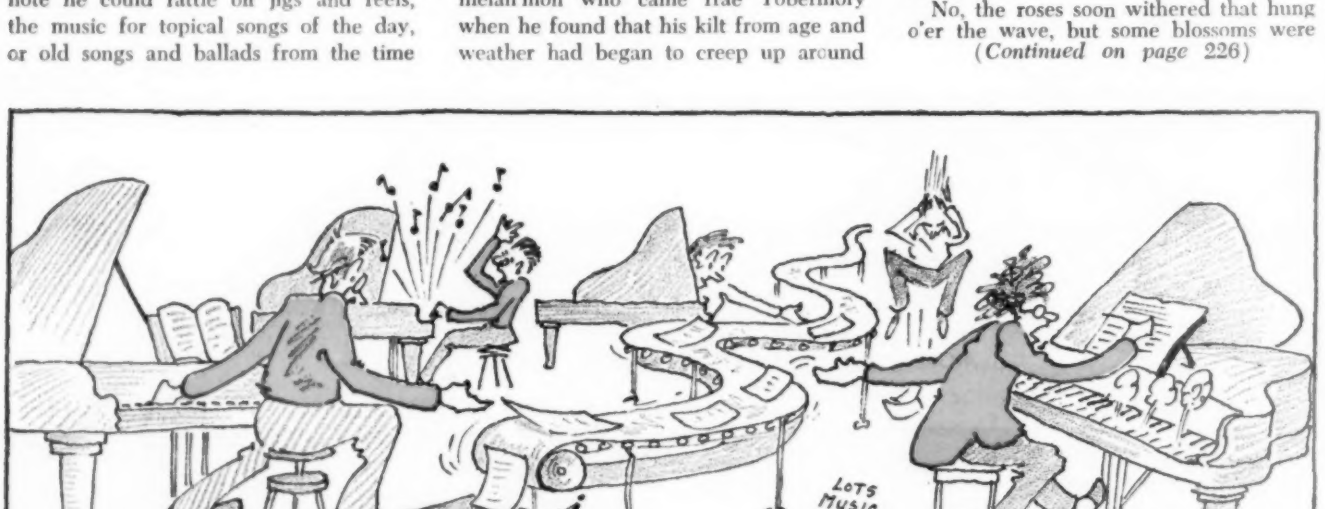
With the peculiar persistence and perversity of inanimate objects and small boys, I sneaked the flute out of its hiding place on several occasions, but to my dismay I found that my little short fingers could not be spread far enough to cover the little openings. Finally through a system of barter and exchange I acquired a battered tin whistle and—I flattered myself—excited the keenest professional envy in every piping thrush and black bird in the neighborhood with spirited renditions of "The Rakes of Mallow," "The Forest of Bondi," "The Pigeon on The Gate," "The Wind That Shakes The Barley," and "Haste To The Wedding."

Some of these reminiscences crept into a talk with Bill the other night. When I told him that I was familiar with the music of "Bendemeer Stream," but never had seen or heard the words until recently, he declared it was one of his favorites and a—well—an exceeedingly cute little number. "Listen," said he, "and you shall hear a stave or two on the Bendemeer." He sat down at the piano, stretched his long neck and coughed two or three times to clear some of the sand out of the pipes. His big paws rambled over the keys, struck a chord and he was off to a better rendition of the song than that of the professional I had heard a few nights before.

There's a bower of roses by Bendemeer's stream and the nightingale sings round it all the day long. In the time of my childhood, it was like a sweet dream to sit in the roses and hear the birds' song. That bower and its music I'll never forget, but oft when alone in the bloom of the year, I think: Is the nightingale singing there yet? Are the roses still bright by the calm Bendemeer?

No, the roses soon withered that hung o'er the wave, but some blossoms were

(*Continued on page* 226)



Product pours through music foundry in steady stream. Only things lacking are cleaning room and hydraulic press

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Finger-tip pouring with MonoTractor and Hoist Unit.

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With thousands of installations to draw from, American MonoRail Engineers are well qualified to offer solutions involving overhead handling equipment. This service is offered without obligation.

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HIDDEN PROFITS

in the chain you use?

Savings reflected from use of TAYLOR MADE Alloy chain are hidden profits. With twice the strength of ordinary chain you have fewer production delays. TAYLOR MADE'S longer life means less frequent replacement. Its terrific resistance to shock...grain growth and work hardness eliminates periodic heat-treatments—reduces operating and maintenance costs. Investigate TAYLOR today. Call your Mill supply distributor or write the factory direct.

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TAYLOR MADE *Chain*

"THE BEST BY TEST SINCE 1873."

(*Continued from page 224*)

gathered while freshly they shone, and the dew was distilled from their flowers that gave all the fragrance of summer, when summer was gone. Thus memory draws from delight e'er it dies, an essence that breathes of it many a year. Thus bright to my soul, as 'twas then to eyes in that bower on the banks of the calm Bendemeer.

"None of this here now modern stuff," Bill declared, "can compare with the old songs. Authors were gentlemen and scholars and were familiar with the art and science of clothing their thoughts in suitable and, in the majority of instances, elegant combinations of words. They moved at a leisurely pace with a quill pen in one hand and a tall glass containing a more or less mild stimulant in the other hand. The vocabulary of most of the modern song writers is on a par with their knowledge of English

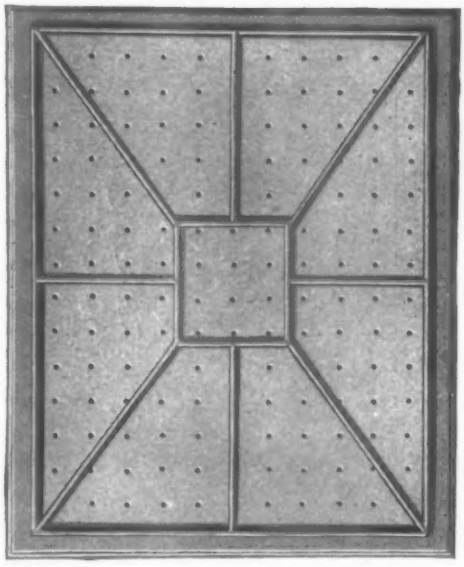
Practicing for Phil The Fluter's Ball

language composition. Some of the most recent horrible examples sound like a two-year old in a tantrum, or the incoherent ejaculations of an illiterate Negro furiously panting through a voodoo dance on the bank of the Congo river in darkest Africa."

"Objection of the gentleman from the green mossy bank carefully noted," I said. "In spite of the belief that I am right in my tastes and instincts, sometimes a mild doubt raises its ugly head. Is it possible that we are losing our grip, falling behind the procession, or failing to keep in touch with the stream of life that never has stopped or looked backward since our first hairy ancestors ceased swinging by their tails, descended to the ground and commenced to walk upright. Whenever I groan, twist my face to register the most acute anguish while forced to listen to one of these gobblygook performances, I am reminded

(*Continued on page 228*)

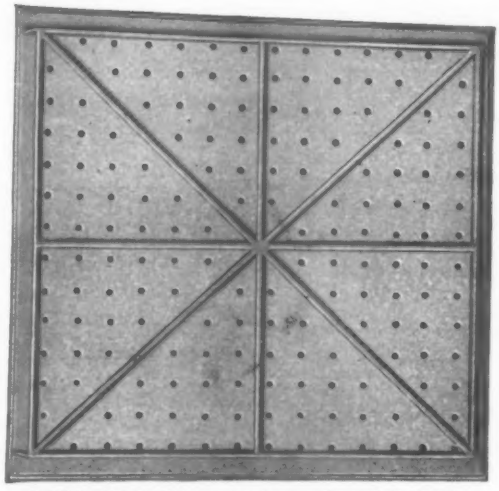
DIAMOND CUSTOM-BUILT
CORE PLATES



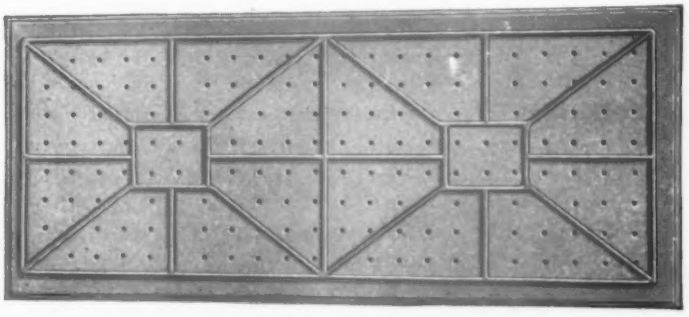
STYLE CP-3—This type reinforcing on "square" plates for loads up to 1200 lbs. Typical sizes run 40" x 50" and 36" x 60".

CARRY CORES UP TO 1200 LBS. WITHOUT DEFLECTION!

Less baking time with Diamond Plates . . . because sturdy construction with light weight is achieved. They heat up and cool more quickly. Fabricated from ½" or heavier plate as indicated to meet load requirements, users acclaim the long-life and uniform quality of Diamond Plates. Available in special and standard sizes to suit your exact requirements.



STYLE CP-1—This construction used on plates in the 30" x 30" range for core loads up to 200 lbs.



STYLE CP-2—For long and narrow cores and loads to the 1200 lb. range. Note web-bracing construction.

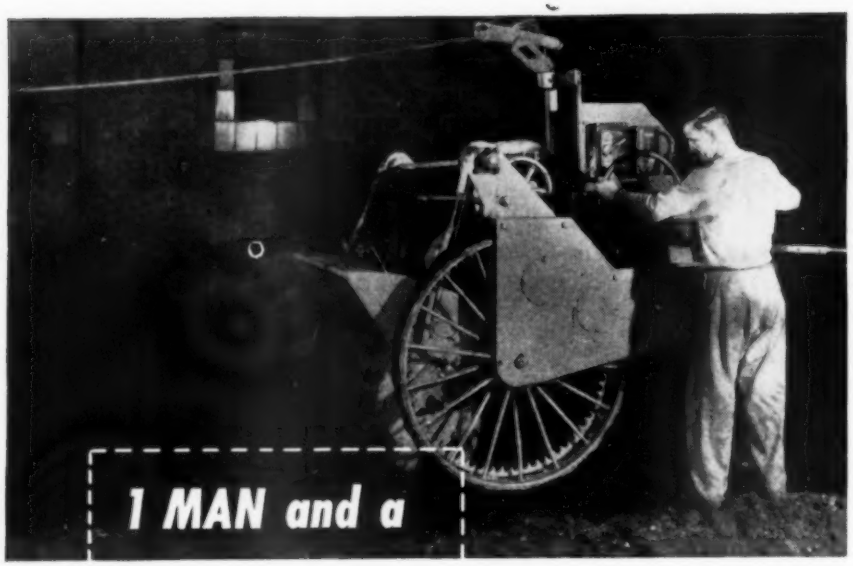
HOW TO ORDER DIAMOND CORE PLATES

Since we recommend "job fitted" plates for real production efficiency, we suggest your telling us *how heavy your core loads will be* and the *approximate overall plate* size. We will design reinforcing accordingly, and quote in terms of plates best suited to your needs.

DIAMOND

Telephone 2553 CLAMP AND FLASK COMPANY Richmond, Indiana

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889



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cut 16 floors in 70 minutes

Cutting each floor 3 times, one man and a Sandcutter cut 16 floors of sand, 40 feet in length, in 1 hour and 10 minutes at the Prospect Foundry Co., Minneapolis. Here again, the Sandcutter has demonstrated its ability to thoroughly condition the sand in less time . . . with less cost . . . with less labor.

SAVED TIME → Before installing the Sandcutter it took two men 8 hours a day to condition the sand. Now 1 man and a Sandcutter do the job in 70 minutes.

SOLVED LABOR TURNOVER → Labor turnover before using the Sandcutter was 57 men in one year. Since the Sandcutter has been installed not a man has left.

SAVED MONEY → A comparative analysis of sand conditioning costs shows a saving of approximately $45.00 daily.

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505 S. Byrkit St. Mishawaka, Indiana

Sandcutters

(*Continued from page* 226)

by one or more very dear and therefore privileged relatives, that the number is clever, or cute, or highly popular, or some other equally silly term. In tones of mild reproof tinged with pity I am begged to come out of my hermit's cave and forget "Annie Laurie" and the "Last Rose of Summer."

"Very good numbers, both of 'em," Bill agreed heartily. "When properly handled the last rose is a joy and delight. The only time it turns sour is when an ambitious amateur with a one-cylinder voice attempts—and stalls—on the spiral above the staff where 'No rosebud is ni-i-i-gh!'

"I knew a boy soprano one time," he continued, "who could take that run without turning a hair and hit that last note as sweet and strong and true as ever you heard it on your father's long black flute. After his voice broke he went to work in the foundry, and between the dust and the smoke and one thing and another, including a consuming ambition to keep in active circulation all the spirituous and malt liquor in the town, he developed a voice suitable only for croaking "Down In The Lehigh Valley," "The Prisoner's Song" and other ghastly products of the songsmith, or blacksmith shop where they forge or weld that kind of tripe together.

"Reference to the foundry reminds me of an inquiry I had some time ago from a worthy citizen who was not satisfied with the operation of his melting furnaces. Here I'll read it for you: 'We melt our metal in No. 60 crucibles in a battery of 10 pit-type coke-fired furnaces served by a single stack 20 x 20 in., and 60 ft. high. Each furnace is 18 in., diam. and 36 in. deep. The flue is 4 x 6 x 12 in. After 5 hours' operation the temperature in the stack shows 742 F with a draft of 45 in. water 12 in. above floor level. At 15 ft above floor level the temperature is 641 F and the draft is 0.38 in. water. Melting cycle is 2½ hours per heat. To reduce this time we have consulted various authorities who have recommended: 1—Close off natural draft grating and install blower fan with individual ducts to furnaces. 2—Install induction fan directly in stack. 3—Close off top of stack and attach induction fan on outside of stack with vent opening to fan from side of stack. We shall appreciate your opinion on the problem.'"

"What did you tell this worthy seeker after enlightenment? Something radically wrong where a furnace takes 2½ hours to melt the contents of a No. 60 crucible."

"I pointed out to this foundryman that his problem may be reduced to the plain elementary fact that the volume of air

(*Continued on page* 230)

65% shorter baking cycle

with new DRY core binder

Case-histories in Swan-Finch files tell the savings story of RB 42 Dry Core Binder—over and over again. You can be sure Swan-Finch has encountered problems similar to yours—*as tough as yours.*

Swan-Finch core binders are always individually recommended, always aimed at better castings at less cost in a specific plant. Chances of sensational benefits with Swan-Finch core binders are always good... always much better than with core binders bought cold from a catalog.

Whether your requirements call for dry binders or liquid core binders, the Swan-Finch man is familiar with both. Call him in and let him take a look at your problem. Swan-Finch 90 years' experience says he'll find the answer to increased production without increasing equipment. No cost attached to his call, no obligation—*no interruption to production.* Coupon brings him.

SWAN-FINCH CASE HISTORY No. 233

Product being made:	Gray Iron Castings
Core Size:	3 oz. to 100 lbs.
Core Mix:	800 lbs. N. J. Silica 80-AFA Fineness 16 lbs. S-F RB-42 Core Binder
Baking Temperature:	400°F.
BAKING CYCLE (with S-F Binder):	Reduced 66⅔%
EXTRA BENEFITS:	Harder core surfaces, smoother castings. Less gas used. Cleaning time and costs reduced.

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Conveyors provide an orderly, efficient system for storing flasks, jackets and snap molds, and yet keep them readily available for rolling onto the production line at a few moments notice.

Investigate Standard's complete line of roller conveyors—especially designed for foundry use. Their smooth action handles the most delicate core with little or no chance of damage. Their extra husky construction with shielded or sealed bearings give perfect protection against heat, dirt, sand, chips and grit, with resulting long time trouble-free operation.

Whatever your needs, Standard Conveyor Co. has a wide range of conveyors for foundry application. A short section — or a complete system of varying widths, weight carrying capacity or combinations can be furnished to meet individual requirements. If you want ideas on foundry conveyor applications write for bulletin **F-447.**

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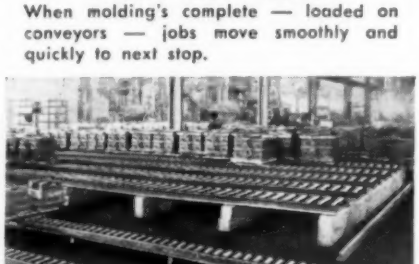
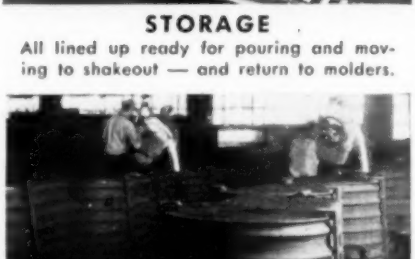
MOLDING FLOOR
When molding's complete — loaded on conveyors — jobs move smoothly and quickly to next stop.



STORAGE
All lined up ready for pouring and moving to shakeout — and return to molders.



POURING AREA
Neatly aligned, the pouring job is simplified — molds can be quickly moved out of the way for cooling and shakeout.

STANDARD
Gravity and Power
CONVEYORS

ENGINEERED FOR FASTER PRODUCTION

(*Continued from page* 228)

passing through the furnace is not sufficient by half to burn the coke in a minimum period of time and at maximum temperature. Under proper conditions a No. 60 pot of metal should be melted in approximately 45 minutes. The data he presented did not give sufficient information on which to base a definite opinion on the cause of the unsatisfactory condition, or the proper remedial measures to apply. A slight adjustment may be required. If it simply is a case of supplying more air, any one of the remedies submitted by the authorities he has consulted would serve satisfactorily.

"However, certain factors may be present that would interfere with the proper functioning of any of the suggested methods. The grates may be too small or too tight. The main flue leading to the stack may be too small. The pit in front of the furnaces may be covered with a plate instead of a grating. If air cannot enter the pit freely it cannot go through the furnaces. The grates may be clogged with ashes. The pot may sink too close to the grate. Instead of speculating on what may be the immediate cause of the trouble, the following outline of good furnace practice on coke-fired furnaces is submitted for consideration:

"The furnace should be large enough in diameter to permit a coke thickness of 3 to 5 in. between crucible and furnace wall, and deep enough to accommodate a coke bed 8 to 10 in. thick under the bottom of the crucible. The top of the crucible is flush with the opening near the top of the furnace leading to the main flue. Special blocks are available, or a fire brick standing on the center of the grate will maintain the pot in proper position. The fire is started, the crucible is lowered into place and surrounded with coke up to the top. The crucible then is filled with ingot metal or scrap or a combination of both. As the coke settles down it is built up on top.

"The grate probably is the most important item in the furnace. This was recognized by all old-time melters who built their furnaces square instead of circular in cross section to provide greater grate area. The grate bars were few in number and spaced 1½ to 2 in. apart. The ends of the bars rested on the cast iron foundation ring which supported the furnace lining. The foundation ring was in halves to allow for expansion and contraction. This is the simplest form of installation, but as with many simple things it is just as satisfactory, and in some intances more satisfactory, than more pretentious installations.

(*Concluded on page* 232)

HEAVY-DUTY

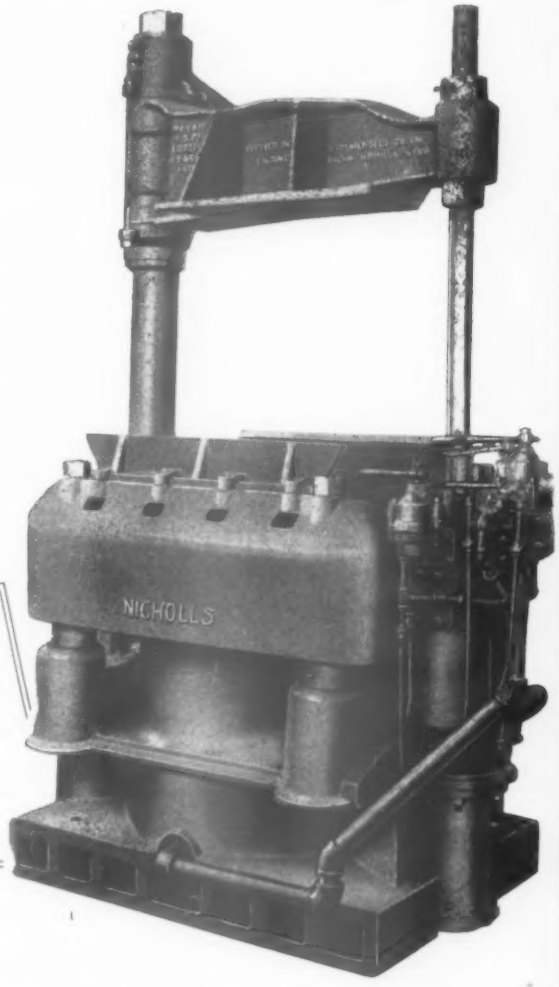
MOLDING MACHINES

JOLT . . . SQUEEZE AND PATTERN DRAW

Can be equipped with Push-Button Control for all operations, including Jolt and Squeeze Timing, measuring Sand Hoppers, Flask Roll-in and Mold Roll-out.

Modern, high-speed foundry work requires the smooth, sensitive operation that is built into all moving parts of Nicholls Molding Machines.

Speed of operation is obtained by keeping the number of working parts and their controls down to a minimum. This greatly reduces maintenance and operation costs and makes for simplicity of operation.



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33-54 Type "D" Molding Machine
33" Squeeze Piston 13" Jolt Piston
Pneumatic Pattern Draw and Equipped with Power Operated Squeeze Head
A Flask Roll-Off Attachment is available as an extra accessory

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High Electrical Conductivity Copper Castings

The manufacturing of high electrical conductivity castings is no longer restricted to a highly specialized group of foundries.

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. . . degasifies and deoxidizes the copper.

. . . protects the molten copper from reoxidation up to and during the pouring operation.

Insuring

DENSITY, SOLIDITY, and HIGH ELECTRICAL CONDUCTIVITY CASTINGS.

Write for complete details.

NIAGARA FALLS

Smelting & Refining Division
Continental-United Industries Co., Inc.
BUFFALO 17, NEW YORK

(*Concluded from page* 230)

"The grate in a circular furnace may be in one or two pieces and arranged to tip after the heat, or at any other time, by hanging from a hinge at one side, or from pivots at each side. Just as with a cupola, a drop bottom grate is a convenience in cleaning the furnace in preparation for each day's operation. However, it is not strictly necessary since the residue of coke and ashes readily may be poked through the widely spaced grate bars. A tilting grate reminds one of the two partners who operated a two-pot shop. Each man used his own furnace and had his name cast on the cover!

"Coming back to the beginning of this discussion I inclined to the opinion that all the inquirer needs is an open grate, a grating over the pit in front of the furnaces, a flue from each furnace 4 x 8 in., a main flue tightly sealed and tapering from 12 x 12 in. at the ends to 20 x 20 in. where it joins the chimney outside the building and opposite the center of the battery of furnaces."

"The foundry business," I said, "is a constant series of bumps, one after another. If there is anything in this reincarnation theory, I should like to join Bro. Moore in a future existence and listen to the nightingale singing around the bower of roses, drooping lovingly over Bendemeer Stream."

"Save a place for me," Bill said. "Good night."

Book Review

Science, by D. W. Hill, cloth, 114 pages, 5 3/4 x 8 3/4 in., published by Chemical Publishing Co., Brooklyn, N. Y. Price $2.75.

In this book the author gives a clear answer to those who argue that scientific progress is leading to man's destruction by showing that if the scientific method is applied in the "nonscientific" fields—in religion, ethics, politics, education and leadership—man will learn how to use the technical inventions of science as stepping stones to social and economic progress.

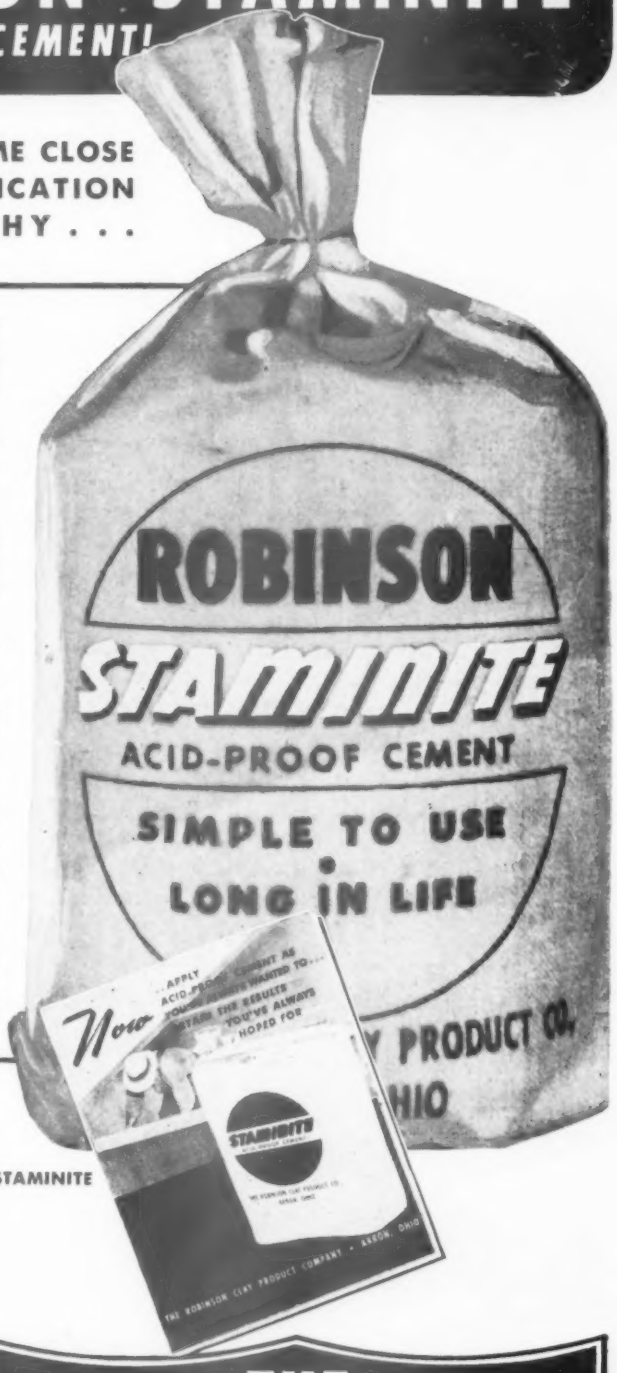
The author believes science to mean the power to think logically, dispassionately, impersonally, objectively and thoroughly, according to a definate pattern that can be consciously adopted and taught to extend knowledge by ordered experiment, and to act fearlessly in the conclusions reached.

The book's thesis is that scientific thought is the mainspring of scientific advance and that it should be also the guide of scientific application. Its aim is to try to dispel the fear of the unknown and to help in deciding what stand to take in the face of the newest overwhelming scientific developments.

Compare ROBINSON STAMINITE
WITH ANY OTHER ACID-PROOF CEMENT!

NO OTHER ACID-PROOF CEMENT CAN COME CLOSE TO STAMINITE EITHER IN EASE OF APPLICATION OR IN PERFORMANCE. HERE IS WHY . . .

1. **EASY TO MIX** — Robinson Staminite Acid-Proof Cement is factory mixed. Simply add water according to directions and use as any cement mortar. No job failure can result from improper mixing. No bulky drums of solvent to handle.
2. **EASY TO APPLY** — Anyone who has used a trowel can apply Staminite. No difficult masonry technique is needed to get a good job with Staminite. Installation is quick and inexpensive.
3. **WATER-PROOF** — Staminite is water-proof to the point of actually becoming harder under water. This outstanding feature allows pickling tanks or other installations to be flushed with water without damage to the cement.
4. **ACID-PROOF** — Resistant to oils, solvents, neutral salts. Proof against all acids, hot or cold, except hydrofluoric.
5. **BEST FOR SULPHURIC ACID CONDITIONS** — Low fluorine content of Staminite (only 2% compared with the usual 8%) makes it far superior where sulphuric acid conditions are encountered.
6. **ABRASIVE RESISTANT** — Staminite Acid-Proof Cement is harder . . . more resistant to abrasive action. This feature permits the use of Staminite in many installations not possible with ordinary acid-proof cements.
7. **SETS CHEMICALLY** — Staminite does not depend on acid washes to become acid-proof, or on contact with air to become hard. It sets *chemically* without interfering with brick-laying.
8. **STRONGER . . . LONGER LASTING** — At the end of seven days, Staminite is acid-proof and water-proof, and equal or superior in durability to the best cement mortars.



WRITE FOR FREE FOLDER GIVING COMPLETE TECHNICAL DATA ON STAMINITE

TRY IT IN . . .

STEEL PICKLING TANKS — Staminite masonry surfaces are long-lasting under severest acid conditions . . . can be flushed with water.

IRON CLEANSING TANKS — Used in foundries to clean castings before they are porcelain enameled. Constant flushing of the tanks only makes Staminite harder.

FLUES AND STACKS that carry acid gases from blast furnaces or other installations where corrosive fumes are formed.

BOILER CHIMNEYS — Staminite resists sulphuric acid. It is an especially valuable bonding mortar in chimneys carrying gases from coal of high sulphur content.

THE ROBINSON CLAY PRODUCT CO.
AKRON • OHIO

REFRACTORY PRODUCTS: Standard and Special Shapes in Silica and Fireclay Brick. Ground Fire Clays, High Temperature Bonding Mortars, Castable Refractories, Plastic, Insulating, Ladle Brick.
BUILDING PRODUCTS: Clay Pipe and Fittings, Septic Tanks, Clay Liner Plates, Flue Lining, Clay Stove Pipe, Chimney Tops, Wall Coping, Meter Boxes.

R-347-23

Industry BRIEFS

MASSEY-HARRIS CO., 615 South Marquette St., Racine, Wis., is this year celebrating its 100th anniversary as a manufacturer of farm implements. Origin of the company dates back to 1847 when Daniel Massey turned from farming to make tools for his neighbors. Soon after the Massey company was established, John Harris founded a competitive company and consolidation of the two in 1891 formed the nucleus from which has grown one of the world's larger implement companies.

• • •

Werner G. Smith Co. recently moved its Chicago district office from 520 North Michigan Ave. to 1608 North Milwaukee Ave., Chicago 47, and at the same time enlarged its sales staff. J. C. Gore, who continues as the company's Chicago manager, is now assisted by C. E. Coulter and William C. Kremer.

• • •

Chapman's Foundry, Augusta, Ill., has been incorporated. Owners are Jay I. and Leona H. Chapman and Wayne T. Shoopman. The concern manufactures iron, brass, aluminum and other metal products. Foundry was established in Plymouth, Ill., in 1935. This plant was destroyed by fire Feb. 9, 1945, and the concern was moved to Augusta.

• • •

Yale & Towne Mfg. Co., Chrysler Bldg., New York 17, plans construction of a new plant of more than 600,000 sq ft floor space on Roosevelt boulevard, at Haldeman avenue., opposite the Northeast Airport, Philadelphia. New plant will replace the old plant of Yale's materials handling division at 4530 Tacony St., Philadelphia, and will produce hoists, hand lift trucks, electric trucks, cranes and other equipment now manufactured at the old plant.

• • •

Aluminum Per-Mold Casting Co., 500 Michigan Trust Bldg., Grand Rapids, Mich., has been formed by John R. Sharp with capital of $50,000 to manufacture and sell aluminum castings.

• • •

Oliver Corp., 400 W. Madison St., Chicago 6, manufacturer of farm implements and industrial equipment, will centralize its headquarters at its foundry at 533 South Chapin St., South Bend 21, Ind. Executive, engineering and purchasing departments now in Chicago and six other plant cities will be transferred.

• • •

Gray iron casting production for January in the Philadelphia Federal Reserve district increased 24.7 per cent over December and was 13.3 per cent over that of January, 1946, according to the University of Pennsylvania's Industrial Research department. Malleable iron production was 55.5 per cent above that of December and up 19.8 per cent from January, 1946. Steel casting production was 22.3 per cent above that of December and 47.7 per cent over January, 1946. Nonferrous casting production was also up, being 39.5 per cent higher than December and 35.8 per cent above last year.

• • •

In the February issue of THE FOUNDRY it was erroneously stated in this department that Schnacke Inc., 1102 East Columbia Ave., Evansville, Ind., had built a foundry and that Ray Smith is foundry superintendent. The article should have read that Schnacke Mfg. Corp., 1016 East Columbia St., Evansville, had built the foundry and that Charles A. Nave is superintendent.

• • •

Arcola Foundry & Mfg. Co., Arcola, Ill., is owned and operated by Wayne Jackson and Grover Cook. Foundry specializes in gray iron machinery castings. Mr. Cook formerly was foundry superintendent, Mt. Vernon Furnace & Mfg. Co., and Mr. Jackson was vice president and treasurer, J. P. Devine Mfg. Co., Mt. Vernon.

• • •

American Manganese Steel Division, American Brake Shoe Co., 389 East Fourteenth St., Chicago Heights, Ill., has received approval for construction of an addition to its foundry to cost $556,000. Equipment will raise the total cost to $1 million. The one-story addition will increase the plant's capacity about 25 per cent.

• • •

Garden City Foundry Co., South Fifth St., Stoughton, Wis., is constructing a $50,000, 100 x 160 ft foundry building addition. Main foundry building is 82 x 200 ft with smaller buildings on the grounds covering another 30,000 sq ft.

• • •

Canton Malleable Iron Co., 2408 Thirteenth St., Canton, O., suffered a $100,000 fire which destroyed about half the plant Feb. 11.

• • •

Hewitt-Robins Inc., Passaic, N. J., has consolidated the Birmingham offices of the Robins Conveyors Division and Hewitt Rubber Division. Effective

(*Continued on page 236*)

Crucible Manufacturer Opens New Plant

American Crucible Co. recently began production at its new million dollar plant in North Haven, Conn. Designed and built by the Austin Co., Cleveland, industrial construction engineers, the plant is said to be a model of efficiency in the manufacture of crucibles and retorts. In recent years the company has interested itself in high temperature refractories used by the foundry industry and this part of the business has been showing continued growth. The crucibles produced from teacup size range to vessels that will hold up to 4000 lb of molten metal.

Organized Mar. 5, 1917, in Shelton, Conn., as the Naugatuck Valley Crucible Co., this company merged with the Chicago Crucible Co. in 1930. In 1935 it was reorganized as the American Crucible Co., under the leadership of Franklin S. Jerome of the Seymour Mfg. Co. Officers of the company are: R. E. Burdett, president; James D. Tetrick, plant manager; Perry C. McCollom, research director and H. M. Chatfield, sales manager.

Pour-Rite LADLES

. . . designed and built by practical foundrymen . . . .

to LAST LONGER
POUR EASIER
SAVE MAINTENANCE

CONSTRUCTION FEATURES

BOWLS: All-welded from extra heavy steel plate, with welded reinforcing and welded pouring lips.

TRUNNIONS: Air-cooled and protected by shot guards.

GEAR BRACKET: Built-in alignment; back-lash adjustment; automatically self-lubricating.

BEARINGS: Antifriction type, self-aligning.

Available with V-bail or square bail, with or without cover, taper side or cylindrical, in a wide range of sizes.

New designs, new construction, new convenience...based on more than 60 years' experience in foundry work and supplying equipment that foundrymen need.

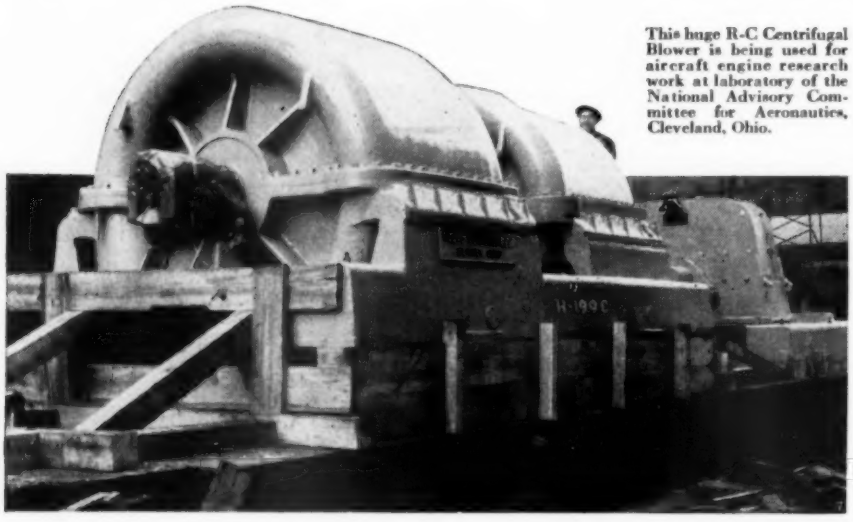
Send for new
CATALOG

WHITING
CORPORATION

15607 Lathrop Ave. Harvey, Illinois

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco, and Washington, D. C. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, N. Y.

Freight car loaded with WIND



This huge R-C Centrifugal Blower is being used for aircraft engine research work at laboratory of the National Advisory Committee for Aeronautics, Cleveland, Ohio.

This freight car packs hurricanes! It's loaded with a Roots-Connersville Centrifugal Blower that in just one minute can push the air out of a 10' circular tunnel, 450 feet long. Or, it can blow a gentle breeze, too, if that's what is wanted.

Not all industrial blowers are that big. But whether they're big or little, Roots-Connersville builds them down to the small Rotary Positive units delivering only ten cubic feet per minute. With both Rotary and Centrifugal equipment to choose from, our engineers can recommend the size and type that will precisely match your requirements. That's R-C *dual-ability*.

For any problem involving the profitable movement of air or gas, call on R-C *dual-ability*, based upon almost a century of specialized experience.

ROOTS-CONNERSVILLE BLOWER CORPORATION
704 Madison Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE BLOWER BUILDERS R-C SINCE 1854
ROTARY CENTRIFUGAL
BLOWERS • EXHAUSTERS • BOOSTERS • LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

• • ONE OF THE DRESSER INDUSTRIES • •

(*Continued from page* 234)

Feb. 10 the Birmingham office, formerly in the Brown-Marx building, has been located at 615 North Ninth St., Birmingham 4.

• • •

American Light Alloys Inc. has been recently organized with a nonferrous foundry at 1265 McBride Ave., Little Falls, N. J. The company is specializing in the production of quality aluminum and magnesium sand castings. William Wilson Jr., formerly general superintendent, Eclipse-Pioneer Division, Bendix Aviation Corp. foundries, Teterboro, N. J., is president of the new company. A. L. Faulconer, also formerly of the Eclipse-Pioneer, is sales manager.

• • •

Indiana State Reformatory, Pendleton, Ind., has added a brass and aluminum foundry to its gray iron casting facilities. Under the direction of John Spohr, foundry foreman, the plant will produce office furniture fittings and handles, and bench marks. All castings will be made for use by state institutional projects.

• • •

Sales of foundry equipment in January represented 513.4 per cent of the 1937-1939 monthly average, according to the Foundry Equipment Manufacturers Association. Sales in December were 430.9 per cent and were 392.8 per cent in January, 1945.

• • •

W. H. Ball Aluminum Castings Co., 502 West Eleventh St., Auburn, Ind., has moved one section of its foundry into a separate building. Original plant now casts only brass while the new addition will pour aluminum castings.

• • •

A. A. Wallace has obtained building permit for a 40 x 90 ft concrete block foundry and machine shop costing $11,500 at 1408 Newton St., Los Angeles.

• • •

Oranco Mfg. Co., 26 North Marengo Ave., Pasadena, Calif., has obtained approval for construction of a $23,500 foundry building on Commercial St., west of Lemon Ave., Anaheim, Calif.

• • •

Anderson Die Casting Corp., 1000 East 60th St., Los Angeles, has obtained building permit for construction of a 29 x 72 ft foundry building at that address.

• • •

Foundries Inc., Dallas, Tex., has been incorporated by J. C. Williams, Ed W. White and C. C. Carson, with $4000 authorized capital stock.

• • •

Columbia Basin Steel & Welding Works, Ephrata, Wash., will be the name of the new iron foundry and machine

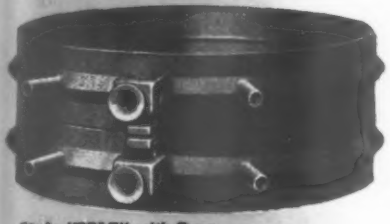
(*Concluded on page* 238)

Style "¾ NT-NNT" with Heavy Duty Clamps and Clamping Bars. (Patent No. 1974292)

Style "¾ NNT-NT" Heavy Duty Flask. (Patent No. 1974292)

Take a Tip from an Old Foundryman

CONSULT STERLING FOR QUALITY FOUNDRY EQUIPMENT

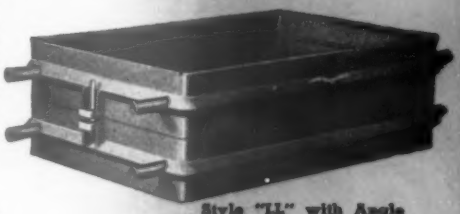


Style "BBLT" with Trunnions and Two-Man Lift Handles.

"For many years, I have looked to Sterling for my foundry flask requirements and I must say they invariably serve my purpose. Sterlings are fabricated from special rolled steel channel which retains rigidity and accuracy and easily meets my demands for high-speed production and long life."

In addition to flasks, Sterling offers a complete line of flask accessories as well as a variety of heavy duty foundry equipment. The Sterling branch office near you will gladly give you information and estimates — or write directly to the factory.

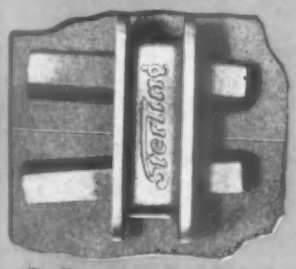
STERLING WHEELBARROW CO.
MILWAUKEE 14, WIS., U. S. A.



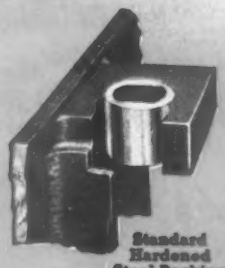
Style "LL" with Angle Re-inforcement and Two-Man Lift Handles.

Style "A"—Double Pin Lugs for stack molding.

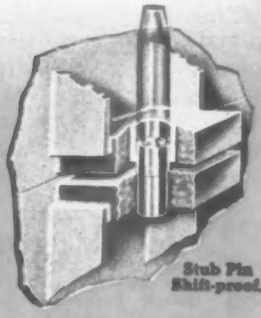
Style "AA" with Loop Handles.



Sterling Flask Clamp.



Standard Hardened Steel Bushing



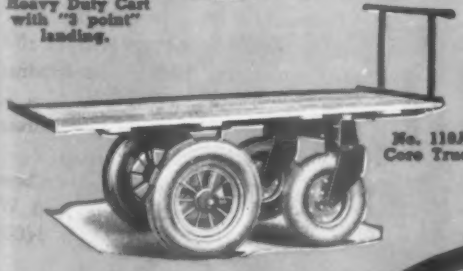
Stub Pin Shift-proof.

Standard Type "S" Flask Pin.

No. 108 Heavy Duty Casting Truck

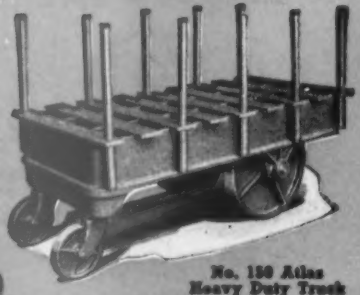
Heavy Duty Cart with "3 point" landing.

No. 50 Slag Buggy



No. 110A Core Truck

No. 116A Wheelbarrow



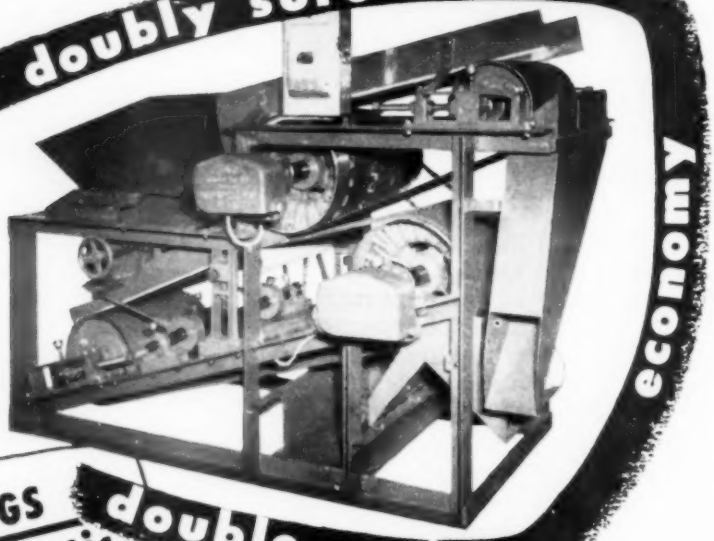
No. 150 Atlas Heavy Duty Truck

Sterling

FOUNDRY EQUIPMENT

BRANCH OFFICES: BOSTON • BUFFALO • CHICAGO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA • ST. LOUIS

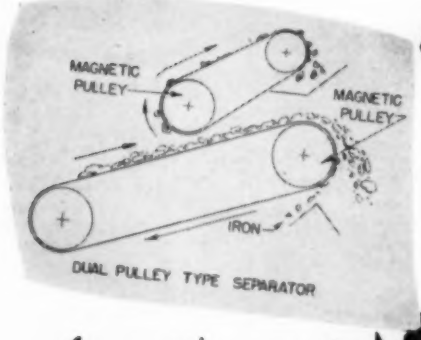
Make scrap separation doubly sure with economy



DINGS magnetic separators — double action

Separation of scrap in your shop is a money-saver! In separating ferrous and non-ferrous scrap, you need the "double action" you get with a Dings DA Magnetic Pulley Separator. Employing two magnetic pulleys in a self-contained unit—one above and one below the material conveyor—provides maximum, selective disentanglement of magnetic and non-magnetic particles. The first pulley lifts the bulk of the iron off the conveyor . . . any particles that are too small or too deeply buried are caught by the second pulley. Thus, between the two, you can be sure—"doubly sure"—of completely effective separation.

how it works:



DUAL PULLEY TYPE SEPARATOR

Ferrous scrap is lifted off the main belt conveyor by the first magnetic pulley. It is carried up and around the pulley on the upper belt and discharged automatically into a chute. Any iron remaining on the conveyor is attracted to the main belt surface, carried to the underside of the second magnetic pulley, and discharged automatically after passing beyond the field of magnetic influence. A reciprocating feeder mechanism distributes the material evenly on the conveyor belt—a very important factor in successful separation—no manual attention except for loading of hopper.

where it's used:

The Type DA Separator illustrated is separating brass and bronze chips in machine shops and foundries throughout the world. Reclamation and separation of scrap can save you untold hundreds of dollars.

Write to Dings for further information and catalogs.

Dings "HIGH INTENSITY"

DINGS MAGNETIC SEPARATOR CO.
4708 W. McGeogh Ave. Milwaukee 14, Wis.

(*Concluded from page* 236)

shop to be constructed by Donald O. Sampson, south of Ephrata between the highway and railroad tracks. Two buildings are planned—one 70 x 375 ft, the other 60 x 375 ft.

* * *

Riverside Iron Works, 10640 Buffalo Ave., Chicago, lost blue prints and specifications in a fire in its gray iron foundry Feb. 13. Damage was estimated at $3000.

* * *

Non-Ferrous Founders' Society Inc., has moved its administrative offices from 75 East Wacker Dr., Chicago 1 to 127 North Dearborn St., Chicago 2.

* * *

Rybolt Heater Co., 615 Miller St., Ashland, O., will construct a building to house the steel division, reconvert the foundry and add storage facilities.

* * *

Lindberg Steel Treating Co., Chicago, has opened a branch plant at 620 Buffalo Rd., Rochester, N. Y., with facilities for heat treating services for that territory.

* * *

Rudisill Foundry Co., Elm St., Anniston, Ala., has obtained approval for work on cast iron pipe shop, to cost about $34,000.

* * *

Columbian Iron Works, Chattanooga, Tenn., plans construction of a foundry building to cost approximately $275,000.

* * *

Albe Foundry Co. formerly located at 261 Elm St., Newark, N. J., has changed its location to Hazlet Ave., Hazlet, N. J.

* * *

H & H Foundry, Penn, Pa., suffered $50,000 fire damage, Feb. 14.

OBITUARY

HERMAN W. FALK, 79, chairman of the board and founder of the Falk Corp., Milwaukee, died Feb. 17, at Daytona Beach, Fla., following a heart attack. Mr. Falk, a native of Milwaukee, organized the Falk Mfg. Co., which later became the Falk Corp. in 1895. He was also chairman of the board, the Heil Co., and a director and member of the executive committee, Allis-Chalmers Mfg. Co.

* * *

Sidney P. Schloss, 65, former vice president, Superior Foundry Co., Cleveland, until his retirement in October, 1946, died Feb. 19, in Cleveland. Mr. Schloss, a native of Terre Haute, Ind., had lived in Cleveland almost 50 years. He was a member of the Northeastern Chapter of the American Foundrymen's Association.

(*Concluded on page* 240)

FERROCARBO Briquettes

THE NEW DEVELOPMENT in malleable iron melting that provides these advantages:

1. Thorough deoxidation.
2. Higher metal temperature at cupola spout—prolonged increase in fluidity.
3. Less tendency for internal shrinkage.
4. Elimination of shrinkage cracks and hot tears close to or at point where risers feed castings.
5. Less breakage of castings during "shake-out." This results from reduction of massive primary carbides with their marked planes of weakness.
6. A finer, tougher carbide structure with evenly dispersed graphite nodules is provided in shorter time.

Actual plant records attest the economies effected by FERROCARBO Briquettes in malleable melting operations. Their possibilities in your plant should not be overlooked. Call in our metallurgical staff for complete information.

FERROCARBO Briquettes

BY CARBORUNDUM

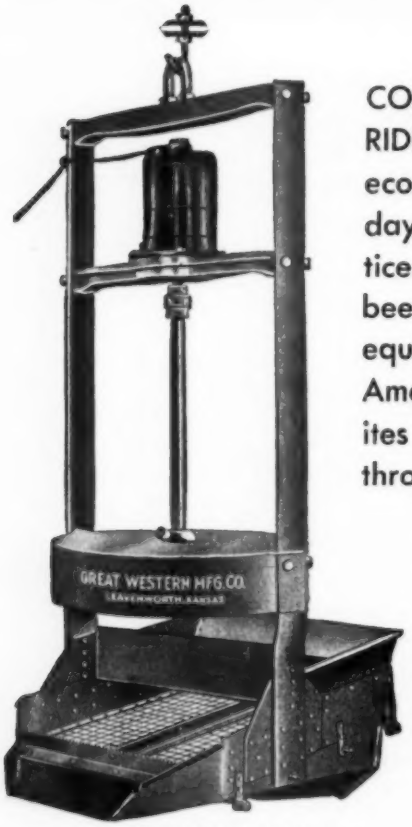
TRADE MARK

THE CARBORUNDUM COMPANY, Refractories Division, Dept. L-47, Perth Amboy, New Jersey

FERROCARBO Distributors: Kerchner, Marshall & Co., Pittsburgh, Cleveland and Birmingham; Miller and Company, Chicago, St. Louis and Cincinnati

"Carborundum" and "Ferrocarbo" are registered trademarks which indicate manufacture by The Carborundum Company

COMBS GYRATORY FOUNDRY RIDDLES



TYPE CS—$270.00 COMPLETE
F.O.B. LEAVENWORTH

COMBS GYRATORY FOUNDRY RIDDLES assure the greatest economy and efficiency in today's high speed foundry practice. These Riddles have long been accepted as standard equipment in foundries all over America and remain the favorites of modern foundrymen throughout the industry.

COMBS GYRATORY FOUNDRY RIDDLES and Equipment are available to you in Foundry Supply houses everywhere. Full information will be sent at your request.

Extra Screens Save Money

Rims are made of heavy steel. Bottoms of extra heavy galvanized after woven wire cloth.

TYPE CR—$260.00 COMPLETE
F.O.B. LEAVENWORTH

Great Western Manufacturing Company

LEAVENWORTH, KANSAS

(*Concluded from page* 238)

Herbert Farrell Sr., 64, president, Farrell-Cheek Steel Co., Sandusky, O., died Mar. 3, in Palm Beach, Fla. Mr. Farrell was born in Nashville, Tenn., and attended Vanderbilt University. His early years were spent as an apprentice in a southern foundry as a molder and later as chief melter on an open-hearth furnace. He founded Farrel-Cheek Steel Co. in 1910.

• • •

Harry Scullin, 79, chairman of the board, the Scullin Steel Co., St. Louis, died recently. Mr. Scullin served as president of the company for 46 years. Prominent in St. Louis civic affairs he had also served as assistant chief of its ordnance office and president of the Army Ordnance Association.

• • •

Kenneth L. Green, 70, former president of the Green Foundry Co., St. Louis, died there Feb. 25. Mr. Green was the son of Hoyt H. Green, founder of the foundry and remained active in the business although he had been succeeded by his son, **Kenneth L. Green Jr.**, as president.

• • •

Edward E. Walker, 65, former president of the Erie Malleable Iron Co., Erie, Pa., died Feb. 19, at his home in that city. A native of Erie, Mr. Walker was graduated from Cornell University in 1903, and served as president of the malleable company until 1932.

• • •

Frederick T. Vaux, 88, retired vice president and treasurer, Adams & Westlake Co., Chicago, died Feb. 15 in that city. He had been associated with the company 71 years, continuing as a director after his retirement in 1923.

• • •

Erie C. Gyllensvard, export and New York office manager of Farrel-Birmingham Co. Inc., Ansonia, Conn., was killed Feb. 17, when struck by lightning while in Sao Paulo, Brazil, on a business trip to South America.

• • •

Frank Baur, 76, retired official of Baur Brothers Foundry, Belleville, Ill., died Feb. 25, at his home in Belleville, following an illness of a month. Mr. Baur retired from the foundry industry 2 years ago.

• • •

William Poulton, 78, who operated the Poulton Foundry, Columbus, O., until his retirement in 1937, died Feb. 9 in that city.

• • •

Jacob L. Trautman, 43, superintendent of the Lake Erie Foundry Co., Buffalo, for 10 years, died there Feb. 7, at Mercy Hospital.

"take it" from Chief Keokuk....

Heap best high silicon pig iron...
...that's KEOKUK Electro-Silvery

FOUNDRIES

30-pound Keokuk Electro-Silvery Pigs for charging mechanically into the cupola. Easily broken into two or more pieces, handled by magnet and measured by weight. Regular or alloy analysis.

12½-pound Keokuk Electro-Silvery Piglets so uniform in weight that they may be charged into the cupola by count, eliminating weighing operations. Handle by magnet. Regular or alloy analysis.

STEEL PLANTS

60-pound Keokuk Electro-Silvery Pigs for blocking the open hearth heat. For equal distribution of silicon and best temperature meltdown. Handle by magnet. Regular or alloy analysis.

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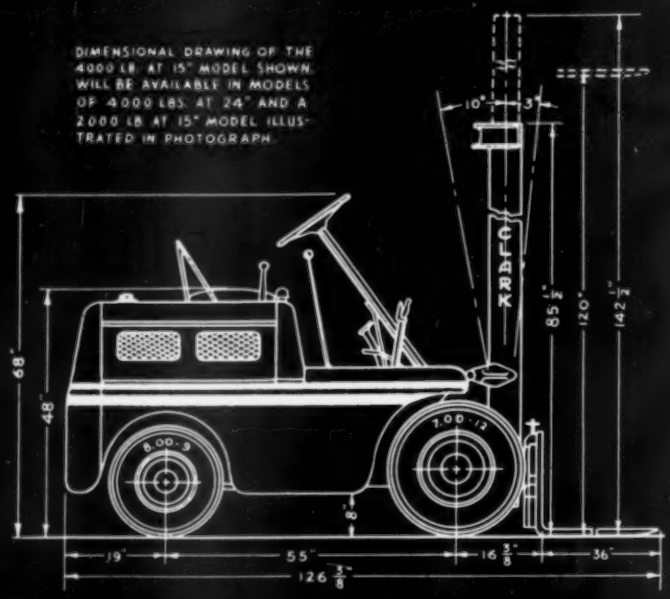
A NEW SERIES OF PNEUMATIC-TIRED FORK TRUCKS . . .



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Announcing the

YARDLIFT-40

YARDLIFT-20*

● The new YARDLIFT series is built especially for tough and rough going—moves one- and two-ton loads smoothly over bumpy yards and crossings, slick floors and docks.

● Featuring the stability of four-wheel design, yet amazingly maneuverable, these machines afford easy operation, easy riding—the newest thing in mobile powered equipment, designed to meet a specific need in material handling.

● Equipped with pneumatic tires and a pivoted steering axle mounting — the YARDLIFT is as easy on the cost sheet as it is on the operator.

● Write for specification bulletins on both of these new fork trucks, and for the modernized "MATERIAL HANDLING NEWS", just off the press, showing New Machines and New Devices.

*YARDLIFT—20 PRODUCTION JUNE '47

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TRANSMISSIONS

CUT COST FACTORS WITH CLARK TRUCTRACTORS

Prices on CLARK products will not be advanced in excess of increased costs.

CUPOLA REFRACTORIES

(*Continued from page* 123)

types of fire clay refractories available.

Much has been published on the manufacture and production of fire clay refractories. It will be desirable, therefore, only to summarize briefly the qualities available and the methods of manufacture.

Fire clay refractories are made, as their name implies, from fire clays. It will at once be obvious that fire clays vary extensively from district to district not only chemically and mineralogically, but also in physical characteristics.

Likewise different methods are used for processing clays and manufacturing the fire clay refractory. The methods commonly employed are dry pressing, extrusion or stiff mud, hand made or wood mould, and special processes.

In discussing fire clay refractories, then, we refer not only to a certain quality, but to the process by which it is manufactured, since both contribute greatly to the type of service to be expected from the refractory.

The fire clay refractories in general use along with their physical properties are given in the table on page 123.

Brief reference has been made in our discussion of the cupola lining to the use of standard shapes to obtain linings of various thicknesses. With the standard shapes available a suitable lining for virtually any requirement can be constructed.

Employ Two Grades

For melting zone service the original installation is usually made with high heat duty or first quality fire clay refractories. Intermediate duty or second quality, though not often used in the original installation, find extensive use in maintenance. Super duty refractories are more refractory and will often show longer service, but for the most part this added service hasn't been sufficient to justify extensive use. Special burned super duty, being much harder and resistant to abrasion and slag penetration, likewise find some application, but are not found economical in most instances. Even super refractories of the mullite type have been tried but their use has been limited for the same economical considerations mentioned above.

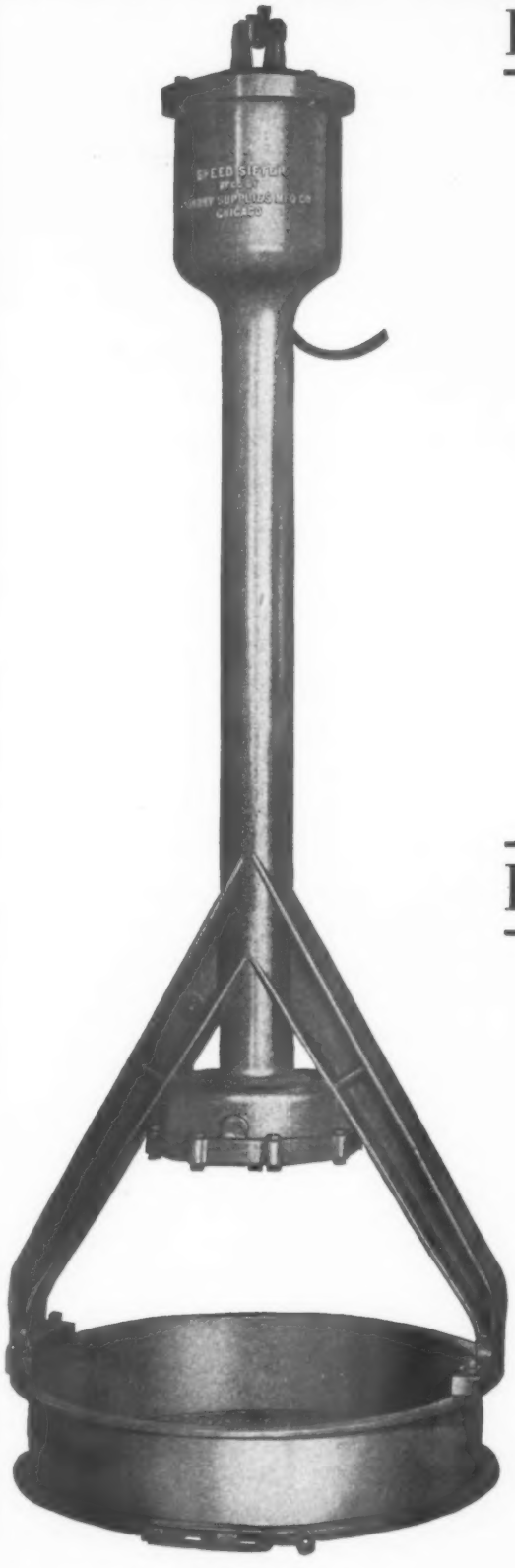
By far the most used is the high heat duty refractory. It is furnished in stiff mud, dry press, or wood mould quality. The stiff mud process block is usually more satisfactory in the most severe service. Some manufacturers have developed the dry press process to the point where very dense and abrasion-resistant

(*Continued on page* 246)

Increase Production

with the

ROTOPLANE SPEED SIFTER ★ RED ELECTRIC VIBRATORS



ROTOPLANE SPEED SIFTER

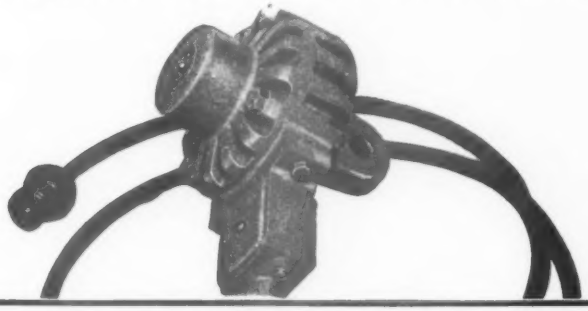
The ROTOPLANE Speed Sifter is an *improved* sand riddle of much greater capacity and much longer life. One size and type serves all purposes in the foundry—does *all* your sifting more quickly and economically.

It is easily handled by one man, weighs approx. 90 lbs., is 62 in. high overall. The one-piece frame of tough aluminum alloy makes for a remarkably effective vibration. Its smooth, free, rotary action vastly increases bearing life; all bearings grease packed. All mechanism of the ROTOPLANE is *completely* enclosed—no bearings or activating parts of any kind exposed to dust and grit.

The Quick-Change Sieves are instantly interchangeable, mounted in smooth, flat steel ferrule, with 20-inch diameter clear sifting area. No jagged edges to tear workers' hands, no storage problem.

$210.00 f. o. b. Chicago — complete with cable, safety ground wire. Standard 1/3 h. p. motor, 110 volt, 60 cycle, single phase.

UNIVERSAL FREE-WHEELING model equipped with motor as above $195.00



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True-to-pattern castings make satisfied customers . . . more repeat business. Increase your production and castings quality with RED Electric Vibrators. Sturdy, dustproof, lowest operating cost (electricity does not freeze). Unequaled for consistent year-'round results in foundries all over the world.

(All Prices f.o.b. Chicago)

No. 1—Light match plate work	$12.00
No. 2—Medium match plate work	15.60
No. 5—Heavy match plate, tub and bench work	20.40
No. 9—Machine and heavier work	28.80

Third (ground) wire per U. S. Govt. code—furnished with No. 9 at no extra cost; $1.20 extra with Nos. 1, 2 and 5 vibrators.

KNEE SWITCHES for operating Red Electric Vibrators: Single pole $3.60, Double pole $4.80.

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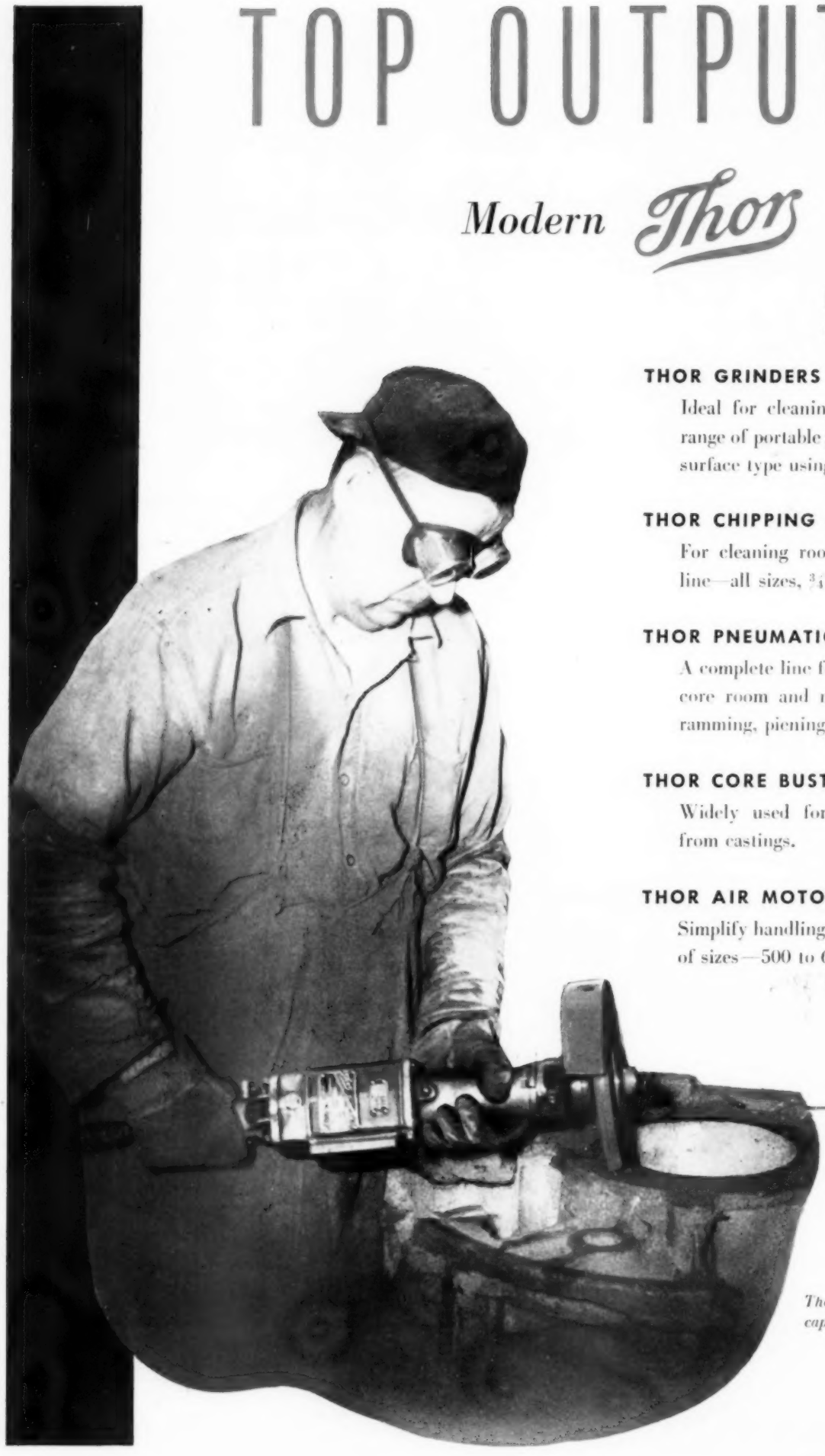
TOP OUTPUT.....

Modern Thor Tools....



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Ideal for cleaning room use. Complete range of portable grinders, radial type or surface type using cup grinding wheels.

THOR CHIPPING HAMMERS

For cleaning room chipping. Complete line—all sizes, $\frac{3}{4}$" to 4" stroke.

THOR PNEUMATIC RAMMERS

A complete line for floor or bench work; core room and molding machine sand ramming, piening and butting off.

THOR CORE BUSTERS

Widely used for knocking out cores from castings.

THOR AIR MOTOR HOISTS

Simplify handling flasks. Complete range of sizes—500 to 6,000 pounds capacity.

Thor 360 Grinder in wheel capacities from 4" to 8".

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When jobs are toughest, powerful Thor Pneumatic Tools get work done faster and easier. Day after day, they stand the gaff of hardest foundry usage—with tremendous capacity for top output at minimum labor cost. With abundance of steady power, Thor Tools are light weight and perfectly balanced for easier handling . . . and extra smooth operation. Instant starting and positive control are plus features. Prove to yourself why Thor Tools are favored by foundries. Your nearby Thor branch will arrange a practical on-the-job demonstration.

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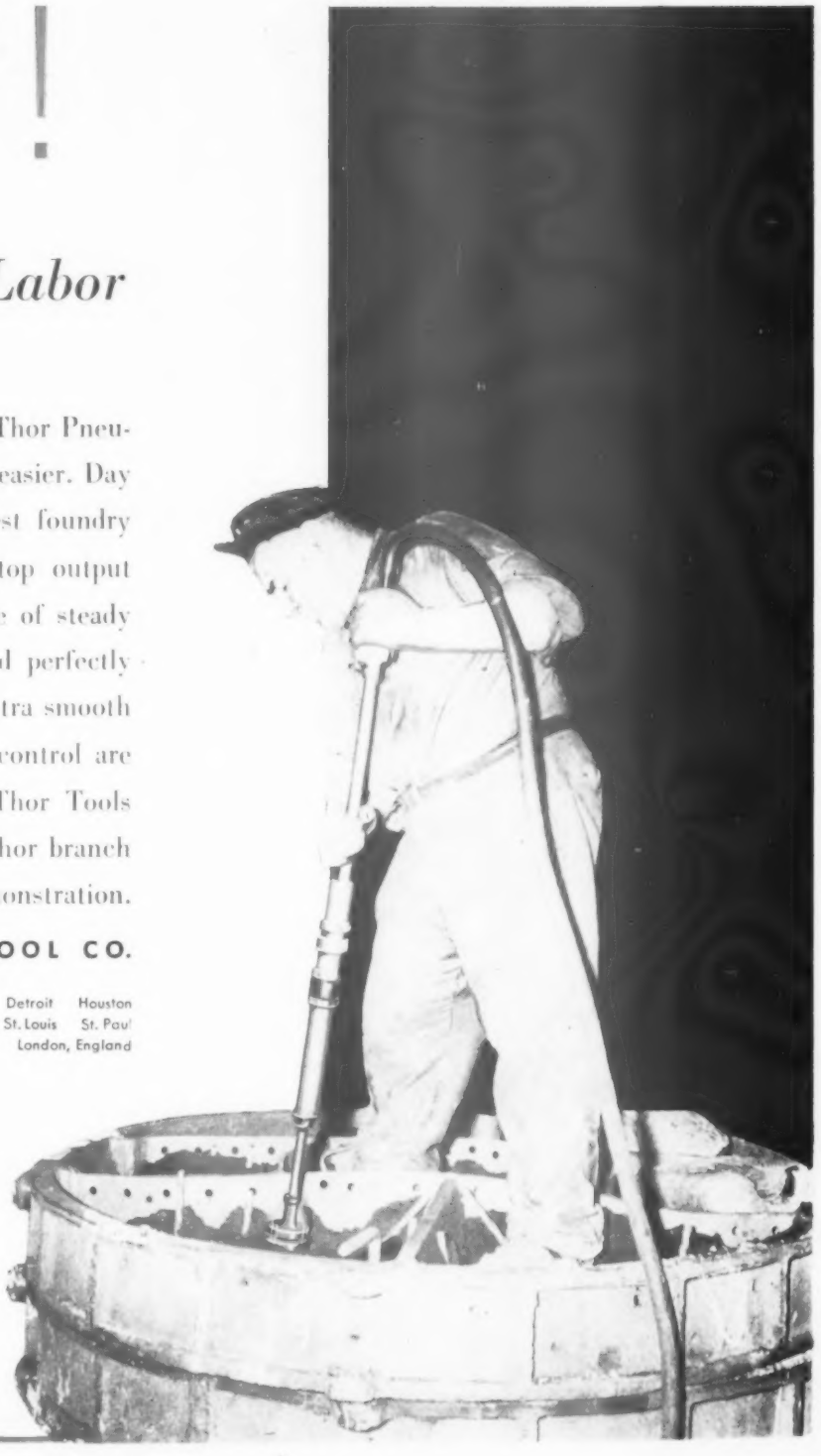

Thor Floor Rammer in Action.

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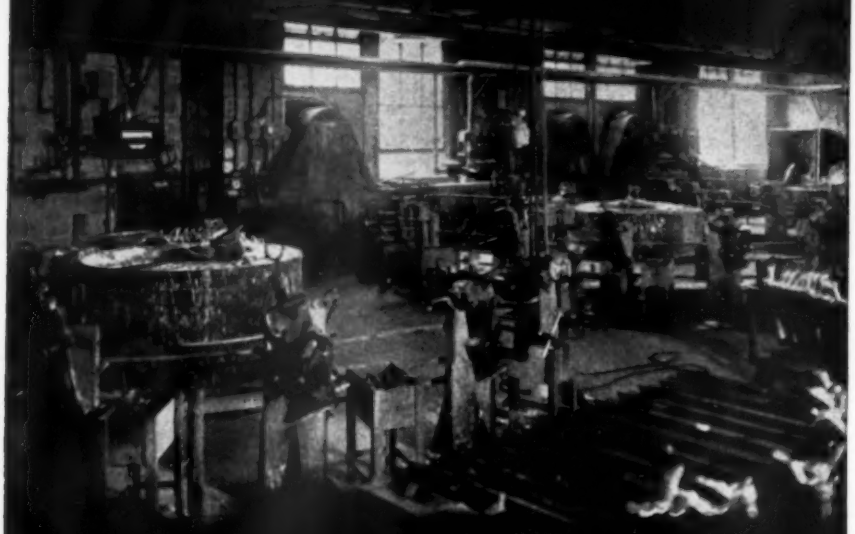
PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

HAUSFELD FURNACES



MAGNESIUM DIE-CASTING

Battery of HAUSFELD 600 lb. Magnesium Furnaces in Die Casting Plant

Photos courtesy of
ARMSTRONG CORK CO.
Lancaster, Pa.

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

(*Continued from page* 242)

blocks can be made. Such blocks have the advantage of more uniformity and greater resistance to thermal spalling, and for these reasons are finding extensive applications in melting zone service.

Unfortunately, many times the most careful study of the conditions encountered will not indicate the most economical refractory to use. The only sure way is the actual service testing, and this is difficult unless the results of several installations are critically compared and analyzed from cost considerations.

Whatever refractory is chosen it is imperative that it be installed properly. Much of the variation of results and poor service obtained from refractories can be laid at the doorstep of poor masonry.

First of all it is essential that the proper refractory combination be used to insure good tight joints. The joints are the vulnerable section in any fire brick masonry where slag attack is encountered. If attaining this end causes the installation labor cost to go up it may well be desirable to check the shapes being used.

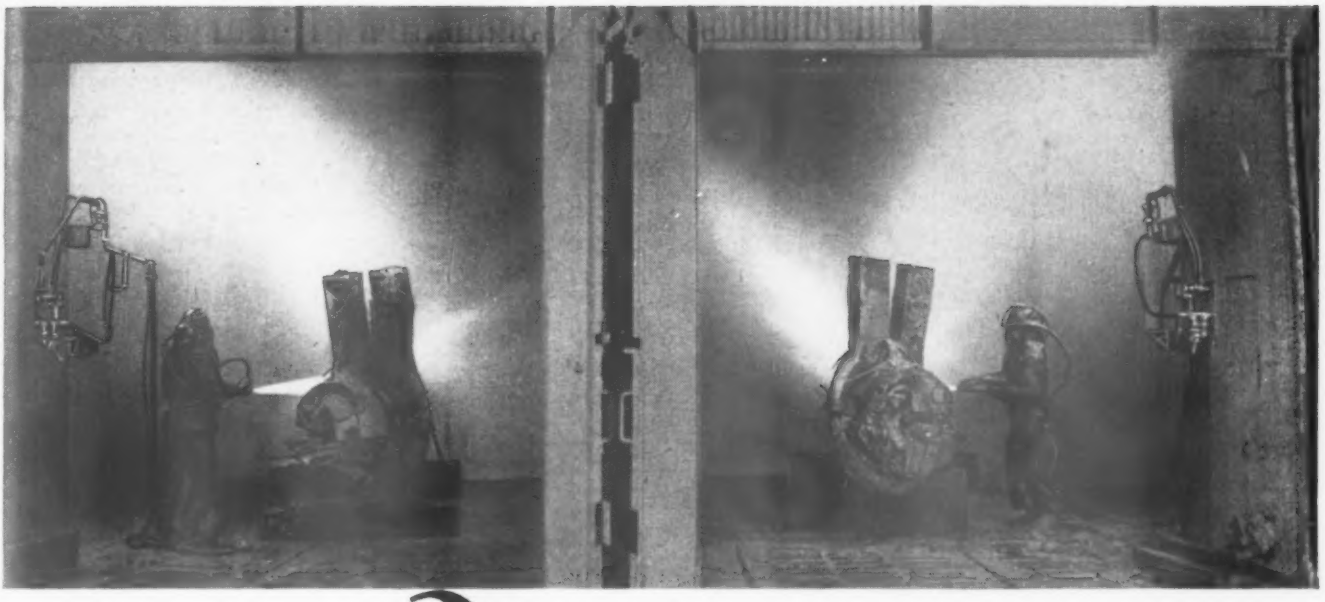
Slag Attacks Joints

It is poor practice to use low fusion, high shrinkage clays in laying up fire clay refractories. This induces accelerated attack at the joints. Nothing less than a clay refractory itself should be considered clay refractory itself should be considered, particularly in melting zone service. Some operators obtain greater safety and better service by using high temperature bonding mortars. This is one possibility that is always worth investigating. It is likewise essential that in using high temperature mortars that they be carefully prepared and used at the proper consistencies to facilitate brick masonry. Too often high temperature mortars are used to cover up poor masonry, rather than to provide for better masonry.

We speak of tight joints, but we must not overlook the differential expansion between refractory lining and cupola shell. Some operators allow 1/2-in. to 1-in. space to be filled in with clay, grog, or sand, depending upon the shrinkage of the fill material to provide for the required expansion. Perhaps an easier way is to separate refractory from shell with a layer of corrugated paper which, of course, burns out to provide the necessary expansion.

There are advantages to be obtained from boshing a cupola melting zone lining by extending the course immediately above the tuyeres toward the center of the cupola, reducing the effective diameter in this area. The advantages are that the tuyere caps are protected, more lining is provided to be burned away and better operation is claimed in that the downward movement of the molten iron past

(*Concluded on page* 248)



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saves money

PLEASES WORKERS

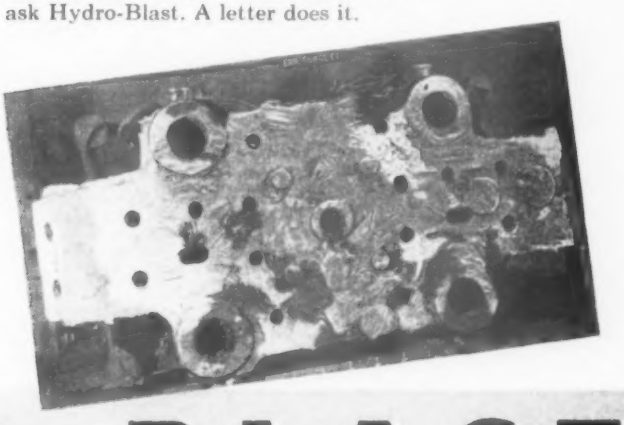
--at ERIE FORGE

KNOCKING cores out of huge and intricate steel castings by Hydro-Blast's wet sand and water method has accomplished two vital benefits for Erie Forge Company, Erie, Pa. . . .

★ ***saves money . . . big cut in man-hours for cleaning heavy castings.***

★ ***vastly improved employee relations due to better working conditions.***

Gone are the dust and noise caused by the old method of core knockout. In their place is a clean and pleasant plant that makes it easier to get good men and keep them. A simple, practical step toward enjoying the same benefits in your business is to ask Hydro-Blast. A letter does it.



HYDRO-BLAST

Chicago 47, Illinois

2550 NORTH WESTERN AVENUE

(*Concluded from page 246*)

the tuyeres is facilitated. It is becoming conventional practice to extend this bosh higher in the melting zone.

In boshing it is desirable to use the proper combination of refractories as the boshed section is enlarged back to the regular cupola diameter. It is desirable if possible to back up the boshed section with proper refractory shapes to permit these backing up shapes to carry the weight of the lining above. Some repairs could be made less extensive if more consideration is given to this practice. In conjunction with this practice the proper use of angle supports in the cupola shell is advantageous. Additional comments on boshed sections of cupola will be made in the discussion of melting zone maintenance.

Some operators use a true monolithic lining in the melting zone by ramming the lining with an air hammer between the shell and a wooden form.. Wilke[1] has described this type of practice. In practice it is necessary to raise the form upward as the ramming progresses toward the charging door. Such linings should be well vented to facilitate drying; they can be burned in satisfactorily in the melting zone proper, but they do not burn in and give service comparable to refractory blocks as the charging zone is approached.

Perhaps the best practice where monolithic linings are desired would be to adopt the monolithic procedure in the melting zone, say 5 to 8 ft above the tuyeres, and use cupola blocks from this point upward to the charging door. This section of blocks should be well supported by angles welded to the shell. The material used for monolithic construction may be plastic fire brick refractories or silica-clay mixes. With the specially prepared mixes proper selection of raw materials, careful blending and proper mixing, milling and tempering are very essential.

Advantages claimed for monolithic construction are: Elimination of joints; lower material costs; longer life and lower labor costs (this will be questioned). The disadvantages are: Poor resistance to abrasion; personal factors; variation in density obtained and the necessity for slow drying. Perhaps the last named is the most serious drawback to monolithic construction.

Natural silica stone can be obtained, cut roughly to the shape of cupola blocks, and as such is sometimes installed in initial installations. Care in laying up these shapes and the necessity of providing for proper expansion are essential

(*To be concluded next issue*)

Reference

1. R. E. Wilke, "Plastic Cupola Patching," AFA *Transactions*, 1939, Vol. 47, page 89.

COST CONTROL
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April 1, 1947

Mr. J. M. Lathrop, Advertising Manager
The FOUNDRY
Penton Building
Cleveland 13, Ohio

Dear Mr. Lathrop:

In re: Your letter of February 7th, 1947.

Thank you for your reminder concerning the preconvention issue of The FOUNDRY. Your letter came at a time when we were ready to announce a new service which we are offering to the Foundry Industry, and we know of no better medium than your publication for doing so.

Practically every Foundry has some form of incentive for their workers, and as a result of the war, the accelerated production and modernization in plants has caused this incentive to degenerate to the point of where it is no longer functioning properly. With this in mind, we asked ourselves, "What can we do to help the Industry out of this dilemma?"

With our staff of outstanding engineers, it was not long before we had the answer to this question. "Why not audit existing wage incentive plans and plant operations just as we audit our books to determine our financial standing?"

As a result, we have developed a comparatively simple and inexpensive plan of auditing, which enables us to ascertain whether deviation from the original plan has occurred, if inequities exist, and where. This information then enables us to build a program to which management can work in order to rectify these conditions.

We know that many of your readers are in need of such assistance, and we will be glad to furnish more details upon request.

Thanking you for your timely reminder, we are,

Very truly yours,

WESTOVER ENGINEERS

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CEW/cv

Surveys Reports Layouts Cost & Production Control Systems Work Flow Charts
Wage Incentives Supervisory Incentives Plant Appraisals Operation Audits

Book Review

Transactions of the American Foundrymen's Association, cloth, 421 pages, 8¼ x 11¼ inches, published by the American Foundrymen's Association, 222 West Adams St., Chicago 6. Price $4 to members and $15 to non-members.

This volume in new format size contains the papers prepared for presentation at the 1945 annual convention of the American Foundrymen's Association. However, due to wartime restrictions particularly on travel and hotel accommodations, that convention was not held, and many of the papers were published in the *American Foundryman*. This issue of *Transactions* contains some 65 papers and reports in addition to the president's annual address, proceedings of the forty-ninth annual business meeting, reports of officers, etc.

Papers presented cover a wide range of topics relating to the various branches of the foundry industry and deal with sand, radiography, patterns, welding, wage incentives, precision casting, matchplates, refractories, safety and hygiene, melting, reduction of microporosity in magnesium castings, etc.

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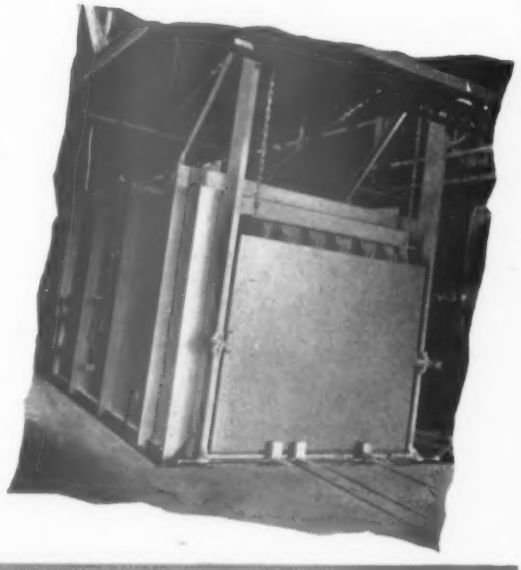
Investigate the EF advantages—and let EF engineers, with their long and outstandingly successful record, work with you on your next heat treating job.



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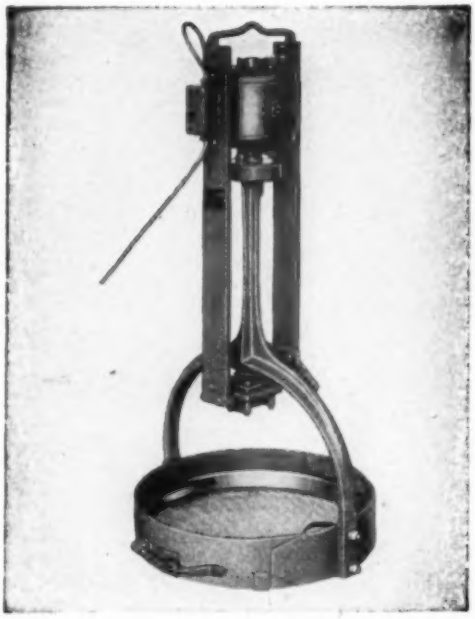

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Save money by faster sifting, better sand conditioning with a Lowe Electric Sifter. Features: greater screening area, enclosed ball bearing motor, more shovelling room. Write for information. Prompt delivery.

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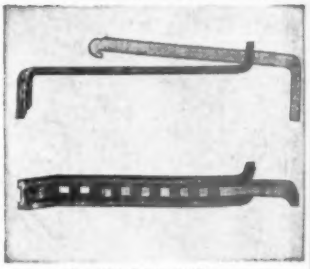
Air operated, fool-proof jolt machines that ensure uniform cores. Sturdy cast iron construction with no external valves to wear out. Made in four sizes. Get our prices and deliveries.

RUBBER-COVERED SHOVEL HANDLES

The best insurance you can buy against damaged patterns, core boxes or flasks. The pean-shaped grip is ideal for ramming.

They will fit your present shovels or you can order your next shovels with them already installed.

The "Lightning" Clamp



The "Holdtite" Clamp

Federal offers two types of flask clamps.
The "Lightning" clamp is an eccentric type, requiring no wedges and available in two sizes: No. 2 8" to 12" and No. 3, 12" to 20".
The "Holdtite" is an adjustable clamp designed for use with wedges and is also offered in two sizes: No. 1, 13" to 23" and No. 0, 18" to 33".
Both clamps made of sturdy malleable iron, rigidly reinforced to prevent distortion.

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SWABS—We have eliminated the shortage of this essential item by making them ourselves. Federal swabs are made of the best flax, ample in size and won't fall apart. They're fully eighteen inches long and full-bodied. Shipped from stock — the supply is ample. Jobber inquiries are invited.

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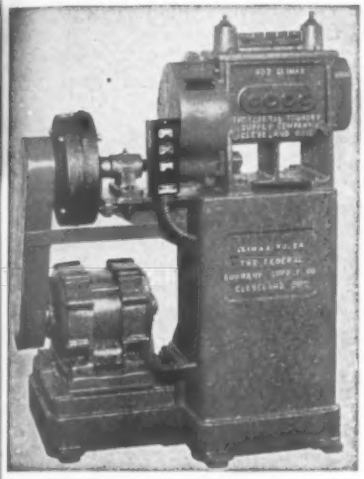

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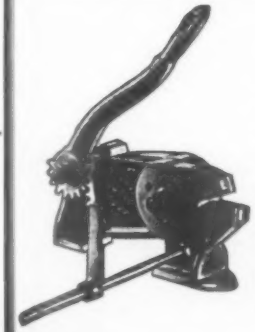
Any foundry, large or small, can cut production costs by straightening and re-using core wires and rods. With a Climax Wire Straightener this can be done quickly, economically, safely — by unskilled labor. A complete descriptive circular is yours for the asking.

TWISTED STEM CHAPLETS

The chaplet with everything. The "Twisted Stem" promotes rapid complete fusion. Not deformed, the stem has no weak spot to burn in and permit core shift. Made in a complete range of sizes. Samples of the size you use, gladly submitted.



FEDERAL'S WONDER CUTTERS

Two compact cutters for rods and band iron. One cuts up to 5/8" round and the other to 7/8" round. Readily mounted on any bench. Users say they're worth their weight in gold!

WATER BRUSH

Easy to Grip and Hard to Tip. It can't leak and one filling lasts all day. Does not tire the molder's hand.

FEDERAL'S "VIBRA-DRAW" CORE DRAWING MACHINES

Cuts costs in your core room by making it easy for every core maker to draw perfect cores as fast as he can fill the core box, place it against the vibrating head and lift the box.

Made in two styles: the floor model shown above and the portable bench model below.

Immediate delivery—write for details.

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LOCAL COST GROUPS

Promoted by Gray Iron Founders

BECAUSE of the success gray iron foundries have had with local cost groups for the purpose of studying foundry costs on a comparative quarterly basis, the cost committee of the Gray Iron Founders' Society Inc., of which A. E. Hageboeck, Frank Foundries Corp., Moline, Ill., is chairman, has inaugurated a program to sponsor local cost groups in other foundry centers.

At present, organizational meetings are planned for the West Coast in San Francisco on Apr. 4 and Los Angeles on Apr. 11. At these meetings Mr. Hageboeck and the Gray Iron Founders' Society cost consultant, R. W. Paulsen, certified public accountant, will explain how a local cost group operates. A meeting also was scheduled for Seattle on Mar. 25.

As of Jan. 15 the society had 12 cost groups in operation serving 210 gray iron foundries located in the East, Central and Midwest sections. Rapid progress has been made in developing groups because foundrymen, today, are cost conscious, realizing the advantages of sound cost information to be able to compare their costs with the costs of other foundries in their area.

In setting up the program for quarterly cost analyses, the cost consultant makes an inspection trip to participating plants to ascertain costing and production information. Thereafter he will be able to prorate accurately various departmental overhead so that uniform cost comparisons for each foundry may be made.

Each quarter participating companies submit to the consultant a completed questionnaire from which a cost blueprint will be prepared for the purpose of making comparative studies at regular "blue print meetings" where those attending may participate in an exchange of costing ideas. Purpose of these cost reviews is to help eliminate wasteful methods, unnecessary operations and the reduction of wasteful labor expenditures. Being a cost group only, such meetings are not concerned with profit rate or selling price.

In addition to cost reviewing, methods and activities of members on matters of special interest to top management, particularly labor trends, material procurement, new materials and similar problems are discussed at these meetings.

The Gray Iron Founders' Society emphasizes that its only interest in sponsoring this cost program is to render a service to the industry, hence it includes both members and nonmembers of the society. The cost consultant will not disturb any method of accounting or cost system any participating company may be using, and all contacts on cost matters are direct with the consultant on a confidential basis.

A SPECIAL SERVICE TO FOUNDRIES

Experience proves considerable *time and money are saved* through expert preliminary analysis, followed by correct overall planning, detailing, and installation of equipment.

If you are contemplating the mechanization or modernization of your foundry completely or in part, we invite you to have us show you case histories on what we have done for other foundries, large and small.

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Important facts about the suitability, maintenance and performance of soda-acid, foam, pump tank, dry powder, loaded stream, carbon tetrachloride and carbon dioxide fire extinguishers are contained in a slide rule type data guide put out by Randolph Laboratories Inc., 8 East Kinzie St., Chicago 11.

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They are built for hard, relentless use *IN OUR OWN FOUNDRY*—which happens to be their most exacting customer.

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The squeezer head is pushed back with a touch of the fingers; and only a light pull-back effort is required for the squeeze operation.

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ARCADE MANUFACTURING DIVISION

ROCKWELL MANUFACTURING COMPANY
FREEPORT, ILLINOIS

STEEL FOUNDERS' SOCIETY HOLDS ANNUAL MEETING

(*Continued from page* 127)

the society are in excellent balance and that every effort will be made to maintain this balance. He suggested that the various members of the society put the results of the survey reports into practice. Raymond L. Collier, in reporting for the Personnel Committee, indicated that the group has developed methods of keeping all members informed with personnel problems throughout the industry. Charles W. Briggs, in reporting for the Specifications Committee, indicated that the group has co-operated with both the Society of Automotive Engineers, the American Society for Testing Materials and the Association of American Railroads in the revising of certain specifications for steel castings.

Following the luncheon, Carl Taylor, president, Waukesha State Bank, Waukesha, Wisconsin, discussed in a most interesting and entertaining manner the type of America that we would like to develop for our children. He indicated that there had been too much government at the top telling the little people at the bottom what to do, and that if our democratic form of government is to continue, the people must be the boss and tell the elected representatives what to do.

In Mr. Taylor's opinion, the biggest job at the present time is to educate the mass of American people on sound principles.

At the beginning of the afternoon session, President Flinterman announced that a number of companies had outstanding safety records in 1946. The following six companies had a zero accident frequency rating: Bethlehem Steel Co., Bethlehem, Pa.; General Electric Co., Lynn, Mass.; Eastern Malleable Iron Co., Wilmington, Del.; Berkley Machine Works & Foundry Co., Norfolk, Va.; Youngstown Alloy Casting Corp., Youngstown, O.; Bonne Terre Foundry Co., Bonne Terre, Mo. The following six

(*Continued on page* 256)

Walter F. Wright

WALTER F. WRIGHT, vice president, Sawbrook Steel Castings Co., Cincinnati, was awarded the Technical and Operating Medal for 1946 at the annual meeting of the Steel Founders' Society of America for his outstanding contributions to the technical and operating development of the steel foundry industry.

Mr. Wright attended Kenyon College, Gambier, O., and during World War I served as a naval aviator. From 1919 to 1924 he was employed by the Ohio Steel Foundry Co. at Springfield, O., in various capacities and in later years served as plant superintendent. Subsequently he resigned to accept a similar position with the Sawbrook Steel Castings Co., Lockland, O., and has been there since. Mr. Wright has been active in the technical work of the Steel Founders' Society and was chairman of the Technical and Operating Committee in 1944-45-46. In making the award, the Medal Committee placed special emphasis on his leadership as chairman of the Technical and Operating Committee; his fostering of active member participation in technical, operating and research projects; his development of a plan of unified action by all T. & O. groups concerning common problems; his enthusiastic personal participation in group meetings and the presentation of a talk on "Riser Efficiency" before the meetings of all groups; his effective efforts in increasing the prestige and accomplishments of the T. & O. Committee, and his significant contribution to the successful organization and staging of the first National Technical and Operating Conference.

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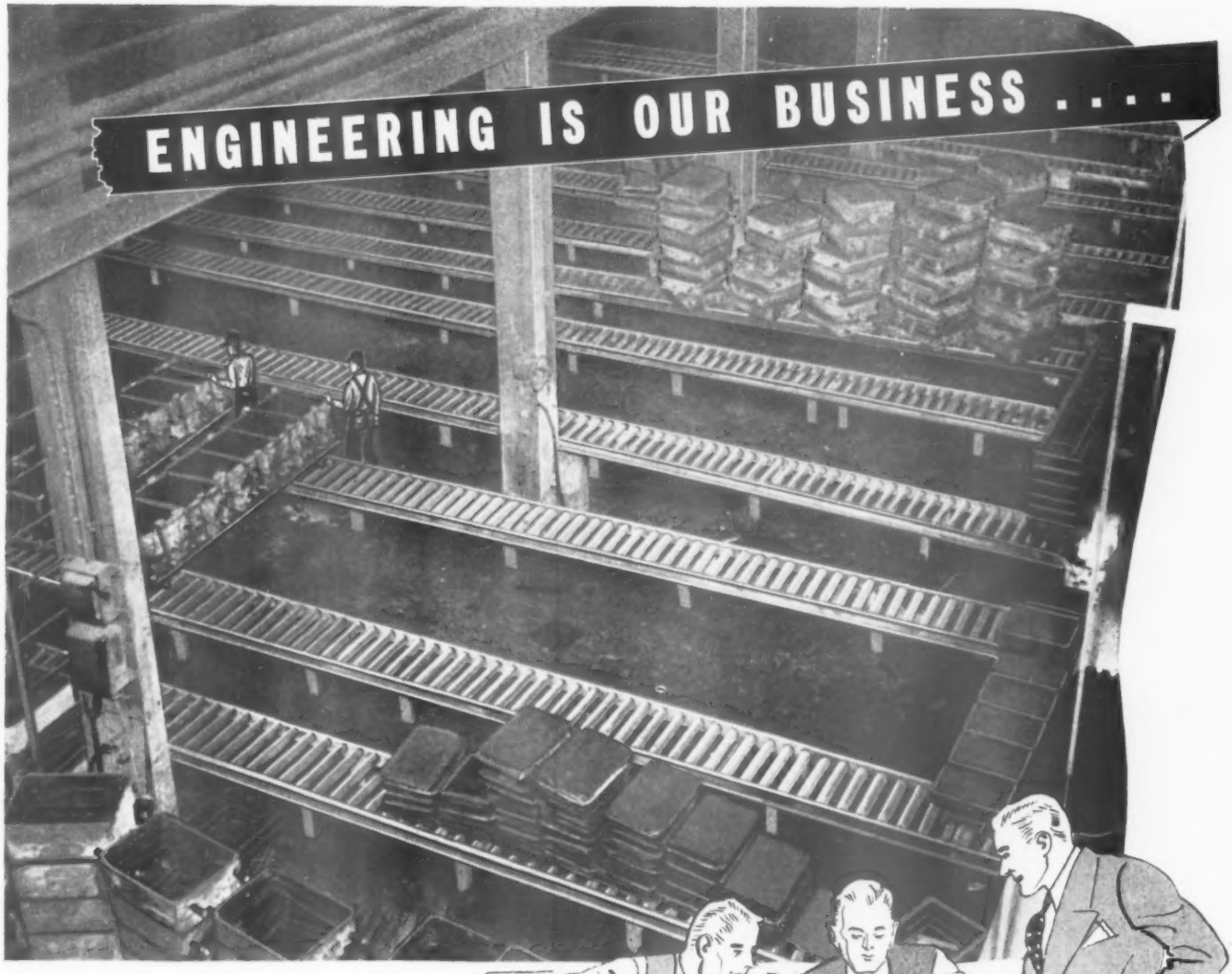

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. . . *Illustration at top* is view from crane in a gray iron foundry making medium size castings. View shows closing and finishing bay in foreground and pouring bay in left background. Molding machines are lined up at extreme right and flow of movement is right to left. Note use of spreader bars or movable racks to increase capacity of conveyors for small molds. Return line for empty flasks in foreground. Logan Roller Conveyor is the basis for all movement in this straight-line-flow foundry.

Logan Conveyors

LOGAN CO., INC., 580 CABEL STREET, LOUISVILLE 6, KENTUCKY

(*Continued from page 254*)

had frequency rates of less than 10: Carnegie-Illinois Steel Corp., Johnstown, Pa.; Chapman Valve Mfg. Co., Indian Orchard, Mass.; Calumet Steel Castings Corp., Hammond, Ind.; General Steel Castings Corp., Eddystone, Pa.; Oklahoma Steel Castings Co., Tulsa, Okla.; Symington-Gould Corp., Rochester, N. Y.

For outstanding service to the steel castings industry and in recognition of the public service during the war, the following members of the OPA Advisory Committee of the steel castings industry were awarded plaques by President Flinterman: Nels K. Anderson, Alloy Steel & Metals Co., Los Angeles; T. H. Harvey, Ohio Steel Foundry Co., Lima, Ohio; Martin A. Fladoes, Sivyer Steel Castings Co., Milwaukee; Clarence Tolan Jr., Dodge Steel Co., Philadelphia; Oliver E. Mount, American Steel Foundries, Chicago; J. A. Sauer, Symington-Gould Corp., Rochester, N. Y.; Lee C. Wilson, Reading, Pa.; Claude L. Harrell, Sterling Steel Casting Co., East St. Louis, Ill.; T. H. Shartle, Texas Electric Steel Casting Co., Houston, Tex.; C. L. Snowdon, Reliance Steel Casting Co., Pittsburgh; E. R. Hinton, Olympic Steel Works, Seattle; Frank M. Robbins, Ross-Meehan Foundries, Chattanooga, Tenn.; Elmer E. Burk, Otis Elevator Co., Buffalo; A. J. McDonald, American Steel Foundries, Chicago; Herbert Farrell, Farrell-Cheek Steel Co., Sandusky, O.; George L. Alston, General Steel Casting Corp., Eddystone, Pa.; and the late Clarence W. Howat.

J. A. Sauer

J. A. SAUER, president, Symington-Gould Corp., Rochester, N. Y., was awarded the Lorenz Medal by the Steel Founders' Society of America at the annual meeting for outstanding contributions to the general welfare of the steel foundry industry.

Mr. Sauer was born in Baltimore, May 11, 1888. He attended the Baltimore grade schools and was graduated from McDonogh School, McDonogh, Md., in 1905. For the next two years he was messenger and machinist apprentice, Mt. Clare Shops, Baltimore. In 1907 he became office boy and later assistant file clerk in the Baltimore office of the T. H. Symington Co. He was transfered to the New York office of that company in 1912 and while working there attended evening classes of the New York University School of Commerce, graduating in the class of 1917. In July of that year he was transferred to Rochester, N. Y. as secretary of the Symington-Anderson Co., one of the five war plants organized by T. H. Symington.

Late in 1919 Mr. Sauer returned to New York as assistant to the vice president, the T. H. Symington Co., and in 1922 he was made assistant to the president. In 1924 he was elected vice president of the Symington Co., successor to the T. H. Symington Co., and held the same office with the Gould Coupler Co., which was taken over by the Symington Co. in 1925. After Symington and Gould were merged in 1936 he was appointed executive vice president, and was elected president in May, 1944.

Mr. Sauer has served the steel castings industry in many capacities. He was chairman of a subcommittee of the OPA Advisory Committee for the Steel Castings Industry. He is chairman of the Education Committee of the society and is a member of the Special Committee responsible for the publication of a textbook on job evaluation and merit rating procedures. He has also played an active part in combating unfair and misleading advertising emanating from sources competitive with the steel castings industry.

For his many contributions to the general welfare of the steel castings industry, J. A. Sauer, Symington-Gould Corp.,

(*Continued on page 258*)

HERE'S WHAT OTHER FOUNDRYMEN SAY ABOUT BUCKEYE SILICA FIRESTONE
• "I have been in the foundry business a little over twenty years and we have never bought a product that met with such instantaneous approval, not only from the superintendent and foremen, but from the workmen themselves around the cupola."
—Foundry in Georgia
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• "Run 77% steel. Buckeye Firestone twice as good . . ."
—Foundry in West Virginia
• "After 145-ton heat in eight hours, man and helper can reline in 12-man hours, including wheeling in stone and clay, and mixing. Same job for ..... would take 24 hours.
—Foundry in Ohio
• "We have used Buckeye Silica Firestone for several years as a cupola lining in the melting zone and find it very efficient and economical."
—Foundry in Michigan
• "Buckeye Silica Firestone very satisfactory. Lasts three to five times as long . . ."
—Foundry in Alabama
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which discusses the problem of foundry modernization

A. A. WICKLAND & CO.
Foundry Engineers.

ENGINEERING BUILDING Established 1919 CHICAGO 6, ILLINOIS

(*Continued from page* 256)

Rochester, N. Y., was awarded the Frederick A. Lorenz Medal of the society. For outstanding contributions to the technical and operating work of the steel castings industry, Walter F. Wright, Sawbrook Steel Castings Co., Cincinnati, was awarded the Technical and Operating Medal of the society.

Dr. Paul J. Mundie of Rohrer, Hibler, Replogle, Chicago, presented an interesting discussion on "Psychological Evaluation of Personnel." Dr. Mundie outlined the various factors connected with both general and specific types of testing and then indicated that such tests can only be used to assist the personnel manager. He stressed the fact that the longer it takes to learn a skill, the more time a company can afford to spend in the screening operation. He indicated that there is something to be said for testing everyone that comes into the shop. Tests may be of the paper and pencil type or the manual type, and a good test should indicate that 90 per cent of the people who pass with a predetermined grade can make good on certain types of operations.

Dr. Mundie indicated that the present trend is toward a general personnel evaluation. He stated that the president of a company must learn his strengths and his weaknesses so that he may use his greatest strengths to the best advantage and correct the weaknesses. Such an analysis should go all the way down the executive line, and should reveal such characteristics as intelligence, ability to get along with other people, emotional control, insight, and motivation.

Frank G. Steinebach, editor, THE FOUNDRY, Cleveland, discussed the many factors which influenced the foundry industry during the war, and the probable effect of such influences in the period immediately ahead. He pointed to the need for co-operative action among the organizations of the foundry industry and reported on the progress thus far made by the National Castings Council.

The following factors were stressed as needing immediate consideration by the foundry industry: Research; increased attention to good housekeeping and greater mechanization of operations; training foundry engineers at the college level and training foundry workers at the high school and trade school level; better customer and public relations; better cost accounting; greater technical control and greater use of foundry knowledge already available.

Forecasts Business Recession

On the second day, R. W. Douglas Clack, Electric Steel Castings Co., Indianapolis, presented an interesting paper "Forcasting Business Trends in the Steel Casting Industry."

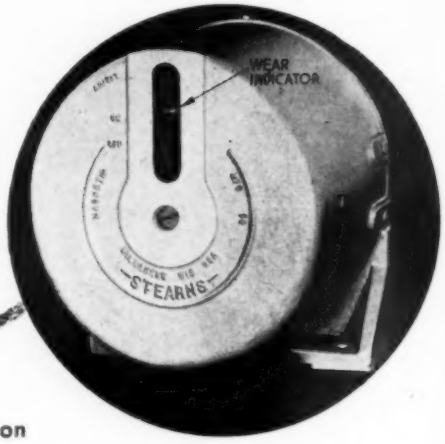
Mr. Clack showed how the following order of events lead prosperity periods into business decline: (1) economic unbalance which squeezes business profits leading to, (2) a peak in prices of all goods and, (3) a consequent decline in prices due to declining demand.

Predicting a moderate decline in business this year, he said: "The 1947 recession should last 12 to 13 months with industrial production down 33 per cent. The industrial production index turned downward last December for the first time since May, 1946. Therefore, if we assume that November was the peak month in industrial production for the 1946 prosperity period, the bottom should be reached between November, 1947, and January, 1948. A 33 per cent drop in the industrial production index from the November, 1946, high of 182, would mean a decline of 60 index points or to a level of 122 between November, 1947, and January, 1948."

O. C. Cool, Director, Labor Relations Institute, New York, discussed the results of a survey which his organization recently has completed showing the

(*Concluded on page* 260)

FOR BETTER BRAKE Performance



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The magnatic brake with the lining wear indicator and manual release—distinctive, original

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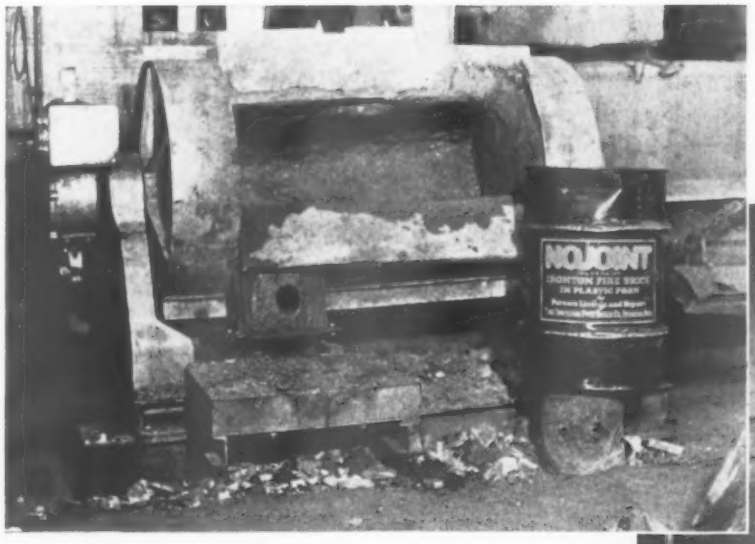
PULLEYS—CLUTCHES—SEPARATORS—DRUMS—MAGNETS

"IRONTON NOJOINT" for Foundry Ladles



"Ironton Nojoint", a special type of plastic ramming refractory continues to give extra long service in U-shaped as well as cylindrical-receiving, mixing and desulphurizing ladles. It is easy to install, it is highly resistant to soda slags and there is no possibility of carbon pick up from "Ironton Nojoint" linings.

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THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO

(*Concluded from page 258*)

various factors which the average workman is thinking about and therefore should be of interest to management. He discussed possible legislation, and indicated that labor leaders must recognize the need for greater production.

Closing the morning session, Chauncy Belknap, counsel for the Steel Founders' Society of America, discussed some of the problems of interest to the society.

At the luncheon, Lee C. Shaw, Seyfarth, Shaw & Fairweather, Chicago, discussed "The Need for Principles in Collective Bargaining."

To Study Light Metal Flow In a Mold

Aluminum and magnesium division research committee of the AFA will sponsor a fundamental study of the hydraulics of metal flow in a mold, Dr. R. F. Thomson, International Nickel Co., Detroit, committee chairman, has announced.

Expected to determine optimum gating and risering design for light alloy castings, the investigation should establish proper size and shape of sprues, gates and runners for attainment of non-turbulent flow, according to Dr. Thomson. Much of the information obtained will be equally applicable to the casting of all metals.

He added that the project has as its objective data which will prove of real assistance on light alloy casting problems such as misruns, cold shuts, entrapped gas, surface quality, and the ratio of poured to finished weight.

The investigation, recently approved by the association's board of directors, will be under Dr. Thomson's supervision, with S. C. Massari, AFA technical director, as liaison with the institution performing the work.

W. E. Sicha, Aluminum Co. of America, Cleveland, is vice chairman of the division's research group. Other members are: C. E. Nelson, Dow Chemical Co., Midland, Mich.; T. D. Stay, Reynolds Metal Co., and Walter Bonsack, National Smelting Co., both of Cleveland, and W. J. Klayer, Aluminum Industries Inc., Cincinnati.

R. E. Ward, Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J., is aluminum and magnesium division chairman.

Corrosion and Heat Resistant Castings

Two new tentative specifications for corrosion and heat resistant castings recently were approved by the American Society for Testing Materials. Developed by the Subcommittee on Castings of Committee A-10, the new tentatives are general purpose alloys and no attempt has been made to include heat resistant alloys of special product applications such as developed by Committee A-1 on Steel for use at elevated temperatures, or alloy castings of the 25-12 class developed by Committee B-4.

Some ten heat-resistant grades are covered in new tentative A-297 with chromium contents ranging from 12 to 29 per cent, and nickel in the respective alloys varying from 9 to 66 per cent. Twelve grades in the new tentative for corrosion-resistant castings A-296 are indicated as suitable for broad ranges of applications and for a variety of services.

Book Review

Bibliography of Industrial Engineering and Management Literature, by Ralph M. Barnes and Norma A. Englert, paper, 136 pages, 8 1/2 x 11 in., published by Wm. C. Brown Co., Dubuque, Iowa. Price $3.

More than 1200 books and bulletins in the general field of industrial engineering and management are listed in this book. It also contains references to over 3000 articles and papers on time and motion study.

FOR EVERY FOUNDRY PURPOSE

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FIRE CLAYS

• The most widely used of all fire clays in midwest foundries. They supply every bond and refractory requirement. These clays are prepared in a large, modern grinding plant, which for 32 years has served the foundry industry with prompt and dependable shipments.

Valuable consultation is available with experienced engineers for the best use of fire clays in foundry bond and refractory service. They often supply important help for the reduction of foundry scrap losses.

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Make "your" next car of fire clay GOOSE LAKE

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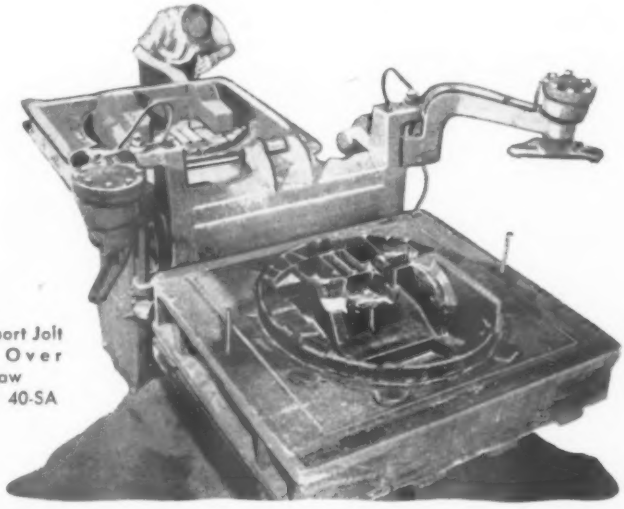
Objective:

TO CLEAR THE BAR AT THE HIGHEST PEAK

Objective:

to build FOUNDRY PRODUCTION to the Highest Peak!

It is essential to obtain high production records at the lowest possible cost. The Davenport mold-producing jolt roll over draw and jolt stripper pin lift combine efficiency and performance necessary to obtain your objective



Davenport Jolt Roll Over Draw Model 40-SA

Davenport Jolt Stripper Pin Lift Model 40-AJS

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Complete your files by writing today for our descriptive data.

FOUNDRYMEN TO SPONSOR ENGINEER TRAINING

(*Continued from page* 115)

James H. Lansing, consulting engineer, Malleable Founders' Society, Cleveland.

The first project of the newly organized Foundry Educational Foundation is the raising of a fund of $280,000, which it is estimated will be adequate to finance the proposed educational program for three years. The funds will be solicited from all producers of malable and gray iron castings, and from all other organizations and companies interested in the manufacture of these types of ferrous castings.

The program of education as developed by the Foundation's committee for future prosecution includes the establishment of special courses in foundry practice and foundry metallurgy at Case School of Applied Science, Cleveland; University of Cincinnati, Cincinnati; Cornell University, Ithaca, N. Y.; Massachusetts Institute of Technology, Cambridge, Mass.; and University of Wisconsin, Madison, Wis. The foundation will aid these engineering schools in the development and arrangement of basic courses of study to prepare young men for the foundry industry. Each of the courses will be for a full year, combining technical work with practical laboratory experience. The courses will be set up by the university, but each institution will receive the advice and the counsel of the Foundation's Technical Committee.

The various engineering schools with which the Foundation plans to work are well located from the standpoint of geographical distribution, and also are well qualified from the standpoint of faculty, initial equipment and interest. Although all schools will cover the same general ground, no attempt has been made to direct closely the manner in which this shall be done. Thus each educational institution will continue to maintain its individuality and will employ effectively the methods with which it long has been identified.

Foundry Courses Established

Massachusetts Institute of Technology will have its four year course in the Department of Business and Engineering Administration.

Cornell University, having become convinced of the value of five years of study, will offer its five-year course in the Department of Metallurgical Engineering.

Case School of Applied Science plans effectively to cover the ground in four years including two summers of combined study and shop work. Its course will be in Case's Department of Metallurgical Engineering.

The University of Cincinnati will develop its foundry course as part of the co-operative educational program with which it has obtained excellent results for many years.

The University of Wisconsin will augment the course which it already had in development, in its Department of Mining and Metallurgy.

In return for establishing these foundry courses and for co-operating with the Foundation in the matter of furthering foundry education among technically trained men, the university will receive a measure of financial support from the funds collected from the foundry industry by the Foundation. This financial support will be used in the following three ways: 1. To provide needed foundry equipment to permit training in modern production methods; 2. To provide scholarships in order to insure that the courses will be elected by an adequate number of qualified students; 3. To supply additional instruction in

(*Continued on page* 264)

IT WILL PAY YOU WELL TO INQUIRE ABOUT OUR

Foundry Cost Systems

designed to assure the accurate pricing of castings for profit

You should find it to your advantage to have your present cost system checked IF you are interested in pricing your castings for a fair profit, and who isn't? All of the factors computed in a selling price are subject to constant change . . . there is no indication that it will be any *easier* to show a good profit picture in the future. At best, a foundry must figure closely and well. For the past 13 years, we have served numerous foundry clients whose cost systems are, they attest, extremely effective.

We invite correspondence with foundry management interested in exploring the possibility of improving or establishing a practical cost system.

WILLIAMS & HANSEN also offer these specialized foundry services:

1. AN INCENTIVE SYSTEM FOR WELDERS in the foundry that really works!
2. A DISTINCTIVE PROCEDURE for the cleaning room which gets results.
3. A PLAN FOR THE CORE ROOM which increases production.

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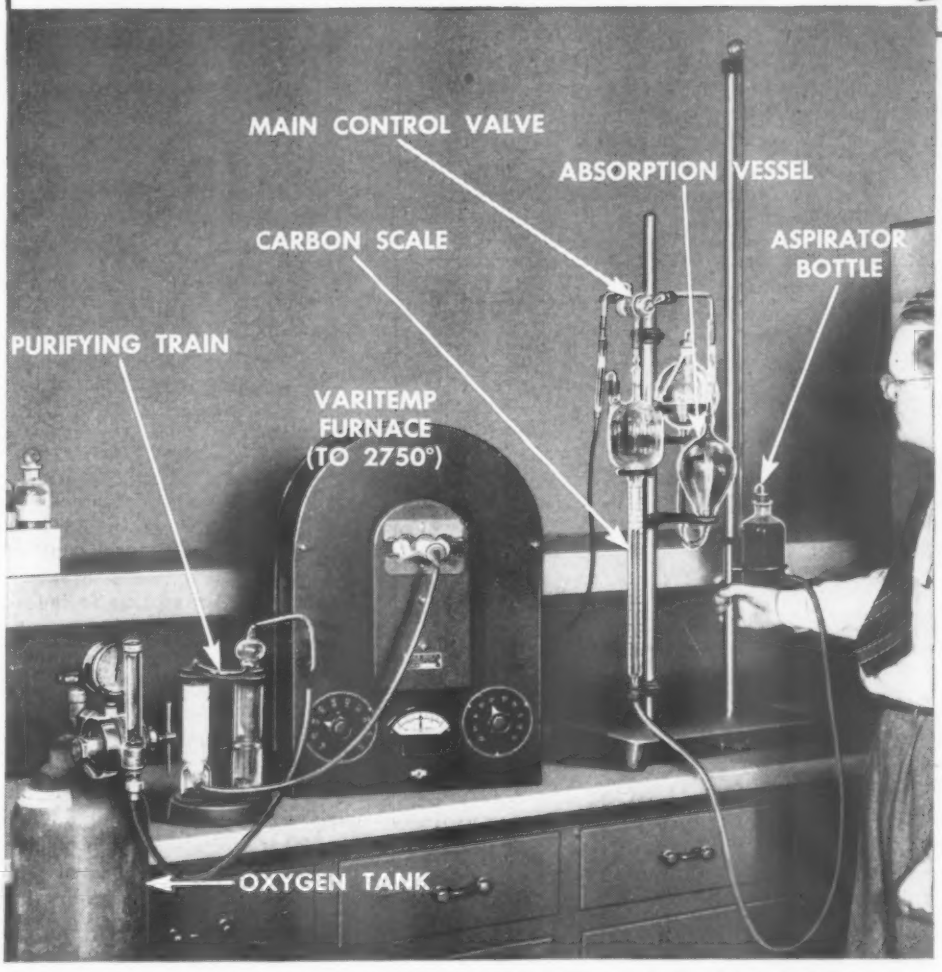
DETERMINE CARBON IN *2 MINUTES*



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DIETERT SAND MOLD CONTROL MOISTURE SULFUR CARBON EQUIPMENT

(*Continued from page* 262)

foundry practice or supplementary lectures.

The equipment needs at the different universities vary considerably and these requirements will be met over the course of the next two years. For the most part the equipment expenses will be nonrecurrent and it is estimated that approximately $97,000 will be required to provide this phase of the educational program. Those studying the problem point out that it may be possible to reduce this estimated cost or to acquire more equipment, provided equipment manufacturers will make substantial donations in kind, that foundries contribute used equipment which is in good condition, and providing some of the required foundry equipment can be procured through the War Assets Administration.

Raising of the entire budget will permit the Foundation to provide a total of approximately 40 scholarships in the first year of operation and 90 in the second year. After the second year it is planned that the program will support 125 scholarship students yearly. These probably will not be distributed equally between the five universities co-operating in the program, and the cash value of the scholarship to each school also may vary. For example, at one institution scholarships may start as early as the freshman year while in others such scholarships may not be provided until the second or third years.

Scholarships will be open to any qualifying student who applies, regardless of race, creed or color. First responsibility in determining the winner in all cases will be invested in the faculties of the universities. Winners of scholarships at Case, Cornell, M. I. T. and Wisconsin would be expected to work at least one summer in a foundry. Since the University of Cincinnati provides a 5-year co-operative course, winners of scholarship at that institution would be expected to take at least two years of co-operative work in foundries.

To Employ Executive Secretary

It is anticipated that the Foundry Educational Foundation will employ a full-time executive secretary to co-ordinate the work. The executive secretary will work with the Foundation Technical Committee and with the university faculties in the development and improvement of foundry courses. The executive secretary will arrange for lectures by men of the foundry industry, as required by the various institutions. He will arrange for summer or co-operative work for scholarship and other interested students. The executive secretary also will assist in the placing of graduates of the foundry courses in the foundry industry.

As yet the Foundry Educational Foundation has made no formal solicitations. The program has been discussed with a number of prominent foundrymen in both the jobbing and captive fields and some tentative commitments already have been made. From these discussions it is apparent that the industry has a marked enthusiasm for the project. Those who have been active in the development of the Foundation feel confident of wide financial support from the industry.

At the out-set of the project, opinion as to the type of program that should be backed by the foundry industry was quite diversified. The original impetus behind the formation of the joint committee was the development in one or more engineering schools of special foundry courses which would stimulate students to elect the foundry industry for a career. The idea also was to give such students basic training which would have real value in the development of that career.

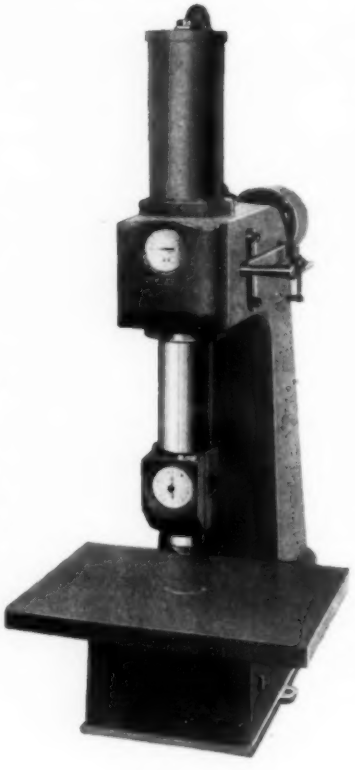
The committee naturally considered the advisability of attempting to connect

(*Continued on page* 266)

Stop Cussing . . .

A BETTER LONG STROKE

BRINELL



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Fast - Accurate - Safe

Available either direct reading, as shown, or as a plain Brinell in a size to accommodate your work. Motor to suit your current characteristics. Other types of standard machines also, in stock. Special machines built to requirements.

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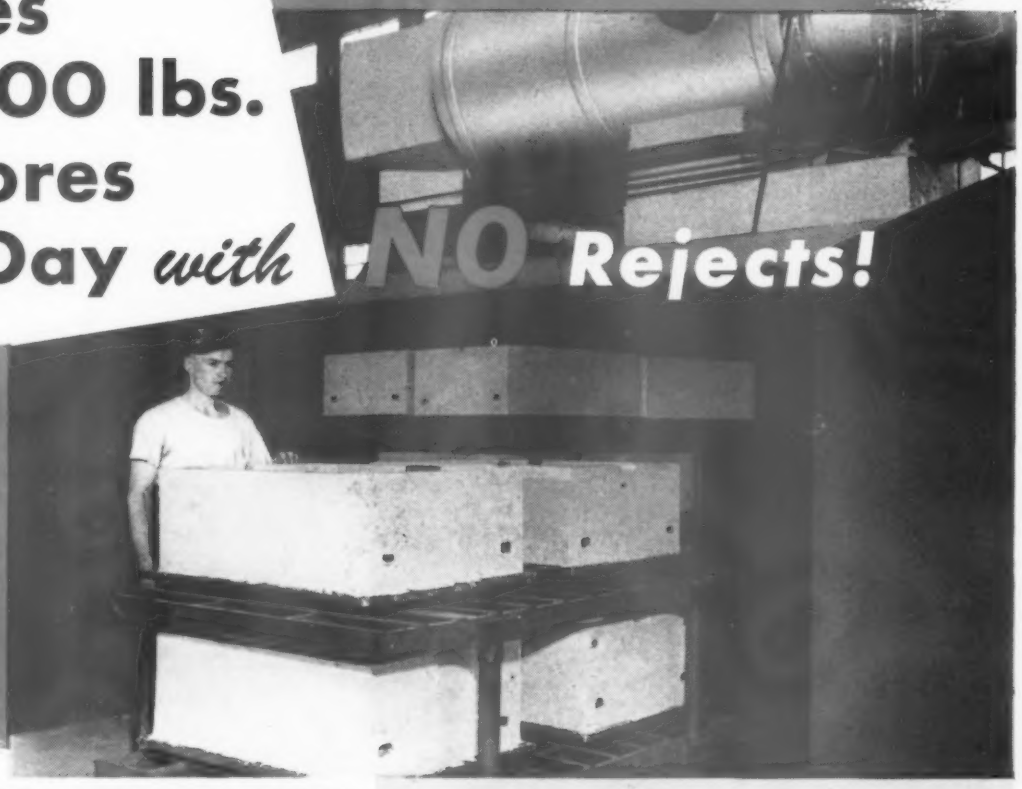
DETROIT TESTING MACHINE CO.

9394 Grinnell Avenue DETROIT 13, MICHIGAN

Engineered to SAVE MANHOURS!

Bakes 43,000 lbs. of Cores per Day *with* NO Rejects!



DESPATCH

BATCH-TYPE

CORE-BAKING OVENS

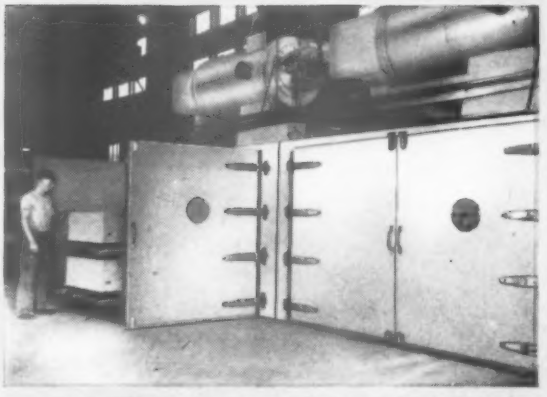
Think of the manhours you'd lose on just *one* of these 450-lb. cores if it were spoiled by faulty baking! Yet in 4½ years of use these DESPATCH Ovens have baked up to 21½ tons of cores daily *without a single reject.* Not a cent's worth of labor wasted.

It's day-in-and-day-out performance like this that makes a DESPATCH Oven the right investment *now*—because you get the kind of engineered heat application that protects you against needless labor losses, gives you maximum core output per man.

Each oven shown here bakes sixteen 450-lb. cores per charge in less than 5½ hours, handles 3 bakes daily. *No labor is required except for loading.*

CAN YOU AFFORD to be without an oven that makes best use of labor and assures *lower* costs per ton of properly baked cores? Call us today!

DESPATCH OVEN CO. 201 Despatch Bldg., 8 St. at 7 Ave S. E. MINNEAPOLIS 14, MINNESOTA



IT'S EASY TO LOAD these two fast-baking Despatch Ovens with lift trucks. Note special load racks for holding 450-lb. cores; each core measures 39" x 27" x 18". Loading takes only a few minutes.

Each oven (inside dimensions: 10½ ft. wide x 7½ ft. deep x 6½ ft. high) has a 750,000 BTU Despatch oil-fired heater, high volume forced convection heating system, automatic recording controls, fume exhaust, etc. Load capacity of each oven is 7200 lbs.

***These ovens bake 300% more per day than older ovens of same load capacity, yet are unusually economical.* (Complete details on request).**

DESPATCH OVEN COMPANY

WRITE TODAY for bulletins photos and performance data

(*Continued from page 264*)

this educational work with a research program but concluded that research could best be sponsored by the various trade associations and individual companies. However, the committee has been conscious of the fact that any educational institution which co-operated with the foundry industry in this educational program would be a suitable place for the conduct of foundry research.

In the early discussions it also was suggested that a function of the Foundation would be the improvement of instruction in all engineering schools to the end that technically trained engineers might learn more about the properties and applications of castings before taking jobs with companies who may be users of or prospective users of castings. The committee believed that this phase of foundry educational work is most important, but that it is being well prosecuted at present by educational committees of the American Foundrymen's Association and several trade associations.

After the joint Committee had been at work for some time, it decided to divide the project into two parts, one dealing with technical education in the universities and colleges, and one dealing with foundry education at the high school level. The work in connection with foundry training in high schools was assigned to a subcommittee which has done considerable preparatory work in the field. However, that subcommittee has not as yet completed its report. It is hoped that an end product of the committee work will be a series of articles or a booklet telling foundrymen how to go about setting up and using vocational school facilities in their own communities.

In undertaking the development of a program at the college level, the committee first developed a list of institutions which, it was felt, might be suitable for such programs. After the list had been developed, different members of the committee were delegated to visit each institution and to collect data on facilities and determine particular interests in co-operating with the foundry industry.

Formulated Tentative Program

Before making these interviews, the committee formulated a tentative program which it was felt might be the requirements of the industry and also would be acceptable to the universities. This program was set up to include everything that the committee members felt essential from the standpoint of making an engineering education serve the needs of the foundry industry. It subsequently developed that these suggestions could be fitted into the curriculum of the various schools which were interviewed, and required in most cases a provision for a few special electives.

After the committee determined that the plan was feasible, it was necessary to make recommendations as to the institutions which should be included in the plan. This was one of the most difficult decisions up to that point, since the committee had evidence that a number of schools were qualified and were interested in doing a job for the foundry industry. After much further study the committee decided it was apparent it would not be possible to support adequate programs in more than four or five places. Choices were made on the basis of facilities, interest, and geographical location. It was desired to have the colleges widely distributed in the sections of the country where the foundry industry is most active. The committee feels that the institutions which have been selected have a real interest in the foundry industry and something special to offer in connection with the program.

Obviously, many other educational institutions also would have afforded suit-

ELECTRIC MELTING of ALUMINUM ALLOYS *No Longer a Luxury*

Aluminum alloy iron-core induction melting furnaces, the first of this kind capable of continuous operation, have been developed at Ajax's Experimental Foundry (see photo upper right). Simplified cleaning methods and improved design of melting channels have resulted in increased lining life and reduced maintenance cost.

Job of melting 300 pounds per hour requires 60 kw. unit (see photo above) occupying about 4' x 4' x 4' space, requiring no foundations and provided with a self-contained internally wired control cubicle, including potentiometer type temperature controller. Operating cost from 40 to 70 cents per hour, with maintenance items almost negligible.

Another unit of 20 kw. capacity is finding wide acceptance as holding furnace in die casting and permanent mold work. Space required is about 3' x 3' x 3', no foundations, self-contained control cubicle. Operating cost from 8 to 12 cents per hour. Metal charge of crucible is 300 pounds.

X-ray investigation carried out on metal processed in Ajax induction furnace proves that accurate (free of time lag) temperature control, typical of these furnaces, allows casting consistently at lowest and most adequate temperatures necessary for sound castings, all of which results in considerable reduction of rejects.

AJAX ENGINEERING CORPORATION
TRENTON 7, N. J.

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

Associate Companies: **AJAX METAL COMPANY**, Non Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

able centers for the development of courses designed to fit students for the foundry industry. The committee regrets that it was not able to work with all of these institutions.

After the final committee recommendations were developed, they were submitted to the board of directors of the Malleable Founders' Society, the Gray Iron Founders' Society and the American Foundrymen's Association. Each of these boards has approved the plan, and the Gray Iron Founders' Society and the Malleable Founders' Society each has appropriated $2500 to finance the organization of the Foundation and the solicitation of funds.

The regulations of the Foundation provide for 11 directors, two of whom will be designated by each of the three founding associations and the balance will be elected initially by the first six. After the first year, five directors at large will be elected by the membership. Inasmuch as the three founding associations represent a large portion of the gray iron and malleable iron industries, it is believed that all members of the Foundation will be represented indirectly by some of the appointed directors, as well as by the directors at large elected by the membership.

Further announcements on the fund-raising campaign will be made shortly by the Foundry Educational Foundation.

RELATION OF STRESS AND PROPERTIES TO CASTING DESIGN

(*Continued from page* 109)

100 F. Therefore, if a light section of a casting cools only 100 F faster than a massive section to which it is attached, a stress of 13,000 psi may result. (See stress-strain curve Fig. 2).

Let us now follow the propagation of internal stresses in a simple casting such as a wheel, Fig. 3, under different cooling conditions using only the above two rules.

Case 1. *Tread chilled, wheel cooled in mold.*

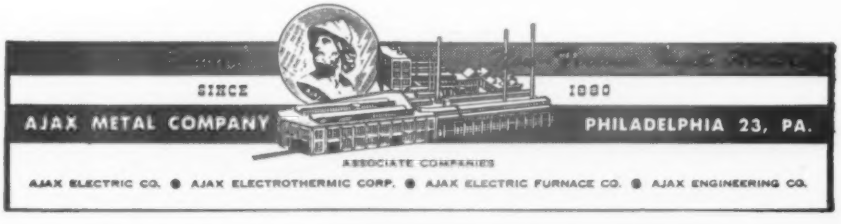
The simplest way to describe the stress formation is to examine the state of stress in the wheel at different temperature levels.

While a wheel is at red heat the metal is predominantly plastic (Rule 1.) If any stress is generated by differences in cooling rate between the parts of the wheel, it is quickly dissipated by plastic flow. Examination of Fig. 3 will indicate that the chilled rim and plate will cool more rapidly than the massive hub section. For example, when the center of the rim is at 1000 F the hub is 1400 F. From the time of solidification, therefore, the outer rim and plate sections have contracted a greater amount than the hub. This produces compressive flow (hot upsetting) of the hub fillet in a radial direction. No appreciable internal stress is present at this time because the metal, being plastic, merely flows when stressed.

The wheel, therefore, enters the elastic range (below 1000 F) with no stress but a severe temperature difference between rim and hub. The hub contracts a greater proportional amount than the rim and since the hub fillet metal is now predominantly elastic, it is stretched to prevent the hub separating from the wheel. From the stress-strain curve, we see that for each 0.001-in. strain approximately 15,000 psi internal stress results. In an actual wheel produced in this manner a residual tensile stress of 32,200 psi was measured. In fact, castings made this way are dangerous and may explode since this high stress level is close to the breaking point of the material.

The foregoing situation is never encountered in normal wheel production,

Designers and foundrymen, charged with the gigantic responsibility of specifying engineering materials for the products of a world once again at peace, are closely scrutinizing the widest range of selectable materials ever offered to industry. Of primary importance is the direct consideration of Performance; and, decisions thus made must, of necessity today, be tempered with new emphasis on total Cost. An alloy, therefore, which measures high in strength, toughness and corrosion resistance—which has cut its eye-teeth long ago on marine castings and fittings, engine bases, pump bodies, gears, etc.—yet permits the foundryman to produce solid castings perfectly free from surface imperfections and which leave the sand bright and clean—and will take a mirror-like polish —an alloy like that deserves investigation. A metal of such calibre is Ajax High Tensile Manganese Bronze. Produced under rigid laboratory standards to constant formulae, this Ajax ingot has established recognition as the highest quality manganese bronze available. Write for complete data NOW.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since the castings are stripped from the mold at a carefully timed interval after pouring while still in the plastic, stress-free range. (Tread 1400 F, and hub 1800 F). The wheels are then placed immediately in annealing pits which equalize the temperature throughout the wheel at about 1350 F. During this equalization the hub contracts a greater amount than the rim, since it cools from 1800 F to 1350 F, but since the hub fillet is still plastic, no internal stress is stored up. The wheels are then cooled over a three-day period to make certain that no further temperature gradients are developed. Actual stress measurements on these pitted wheels show an average stress of less than 1000 psi.

Residual stresses, consequently, are the direct result of developing differences in temperature between portions of a casting while it is in the red-hot plastic range and then allowing these differences to exist into the elastic range.

Residual stresses may be avoided by one of the following methods: 1. By providing for equal cooling rate in different portions of the casting. 2. By a hot shakeout and equalization of temperature before entering the elastic range. 3. By reheating the casting to the plastic range (about 1000 F) and cooling slowly enough to avoid temperature differences.

Rule 2 has been illustrated by the example given. Rule 1 may be applied to the same casting if the chiller can be omitted. A casting was poured in the same mold with the exception that a sand tread was substituted for the chiller. The rim and plate sections still cooled more rapidly than the hub but the gradient was less severe and less plastic flow occurred than when the chiller was used. The mechanism of formation of the stress in the front hub fillet was the same and an average reading of 9500 psi tensile stress was obtained in comparison with the 32,200 psi with the chilled tread.

A final step to reduce internal stress was the insertion of a circular core of triangular cross section in the hub. This provided practically equal metal sections throughout the wheel and therefore removed temperature gradients. Stress was reduced to below 2000 psi.

This method of stress control through design is to be preferred when it can be used, not only because of elimination of heat treatment, but because the mechanical properties of the mold-cooled structure are usually preferable to those of the reheated structure.

Control Internal Stresses

The practical considerations for the control of internal stresses in castings are:

1. Castings of approximately even sections, free from chill, require only occasional checking for critical applications. This assumes that the castings are mold cooled to at least below 800 F.

2. When uneven cooling is suspected, a rough check may often be made by shaking out the casting at red heat and searching quickly for visible temperature differences. A more accurate method is to perform a careful thermocouple survey.

3. When uneven cooling cannot be avoided, the internal stresses should be measured and the results discussed with the customer to determine if stress relief by either controlled cooling or reheating is necessary. At times, the proper controlled residual stresses may be advantageous. A common example is the use of shot peening to produce residual compression in the surface layer, since most fatigue failures are in tension.

Stress Measurement in Service—In quality production the trend is changing from thinking of castings as shapes to be made, to contemplating the castings in terms of the service they perform. If the first two steps have been followed, we have provided the customer with a casting of a definite structure with known

(*Concluded on page* 270)

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Transite Core Plates offer all these advantages:

They speed production—Core makers save trips . . . handle many plates at one time.

They last longer—Made of fibrous asbestos and cement, Transite Core Plates resist shock . . . are less likely to crack or break.

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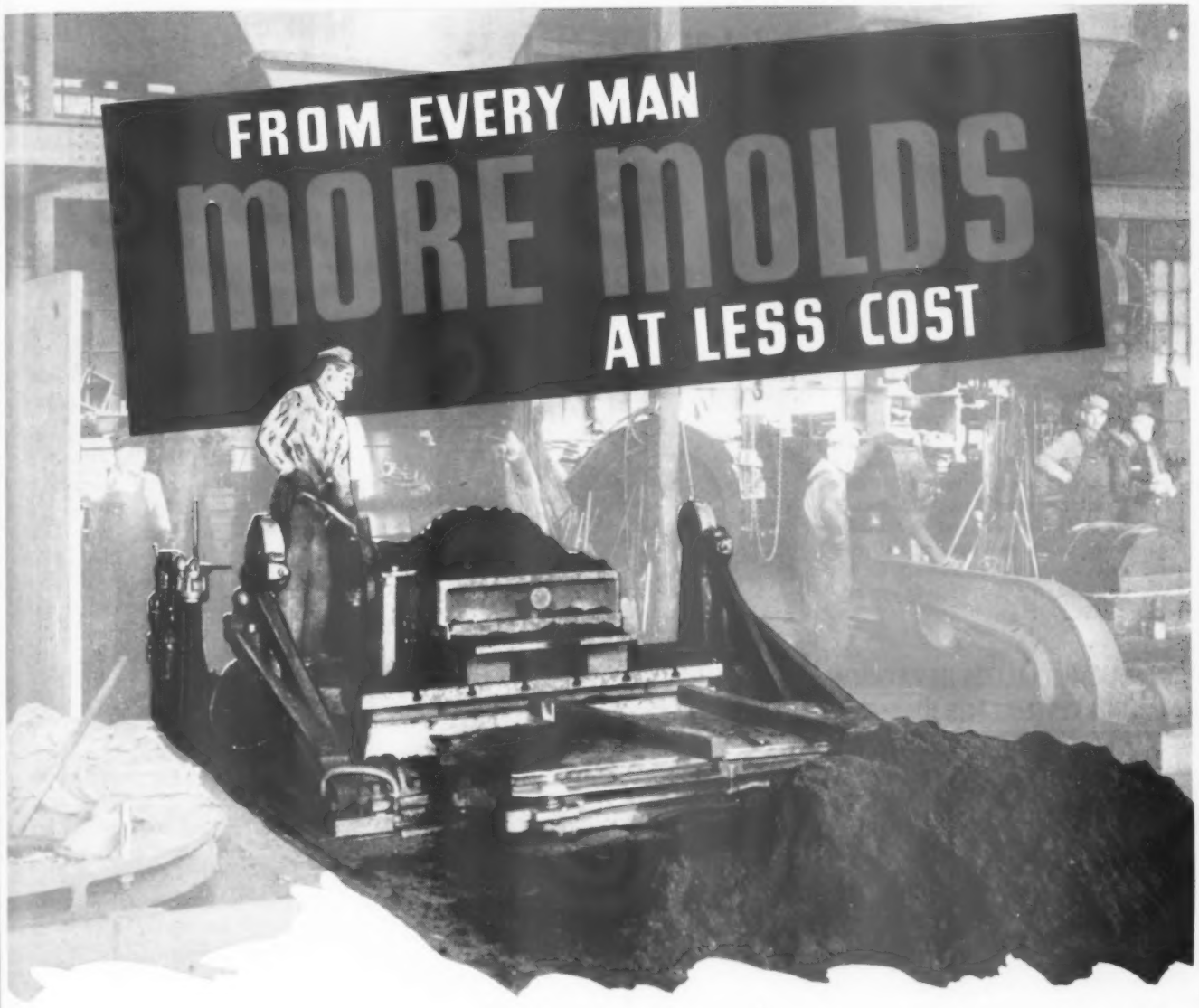

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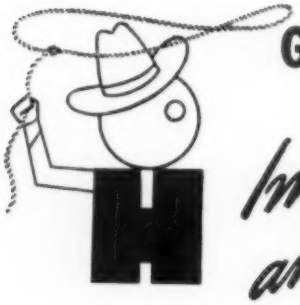

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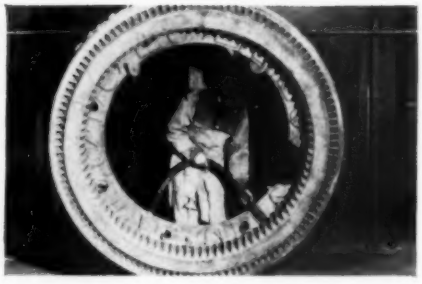

Reclamation of blasting shot, removal of sand—both done quickly, safely and economically with Hoffman Vacuum Cleaning.

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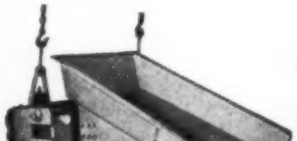
"Vibra-Flow"

VIBRATORY FEEDERS



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—feeding sand at molding stations, to screens, mixers, etc. in processing and conditioning systems.

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Rheostat control of volume flow—from a trickling dribble to gushing torrent.

Write for Folder No. 9-46

SYNTRON CO.

540 Lexington, Homer City, Pa.

(*Concluded from page* 268)

properties and internal stresses. The final step is to observe the relation of those properties in service. To understand the service stresses we must measure them. Most consumers are delighted to make co-operative measurements of service stresses, and when the requirements of the parts and the potential business indicate this work, it should be done. Such service research not only outlines clearly the requirements of the particular application but also provides the foundryman an invaluable background for future reference.

Measure the Changes

To measure the changes in the stress pattern in the casting under static or dynamic conditions requires the use of SR-4 gages just as in the case of internal stress measurement. Recording equipment and more responsive gages are usually needed for rapid dynamic measurements. Often, however, a study of the residual stresses by static measurement in the returned casting after known service performance will be enlightening.

After such co-operative study of service conditions, any redesign will be partly, at least, under the control of the foundryman and the best balance between production cost and service may be obtained.

In conclusion then, we recommend the following steps to produce reliable, economical castings for highly stressed engineering applications.

1. Provide the designer with the complete knowledge of the mechanical properties to be expected in a particular casting, including a representative stress-strain curve tension or compression as required.

2. Recommend either a design to avoid internal stresses or determine internal stress levels at critical points. Reproduce internal stress conditions when they have once been established, using the same care as in obtaining mechanical properties.

3. When possible, follow the performance of the casting by service stress measurements and redesign accordingly.

To Discuss Corrosion

National Association of Corrosion Engineers will hold a conference and exhibition at the Palmer House, Chicago, on Apr. 7 to 10. During the four-day meeting eight technical sessions will be held at which 32 papers relating to the latest developments in combatting and controlling corrosion will be presented. A. B. Campbell, Southern Standard Bldg., Houston, Texas, is executive secretary of the association.

How to Eliminate Slag Hole Failures in continuous-pour cupola

A good way to avoid slag hole troubles in continuous-pour cupolas is to install CARBOFRAX silicon carbide blocks.

As these blocks retain their uniform hole size, the slag stream is almost constant. Making this possible is the excellent slag erosion resistance of the hard, dense CARBOFRAX blocks. There is practically no hole enlargement even when the blast is on. Adding to the durability of CARBOFRAX blocks is their minimum tendency to spall and crack. Freedom from rapid disintegration is assured.

Check the possibilities of CARBOFRAX slag hole blocks for your continuous-pour cupolas. Their use may save you costly shutdowns. For more data write today to Dept. L-47, The Carborundum Company, Refractories Division, Perth Amboy, New Jersey.

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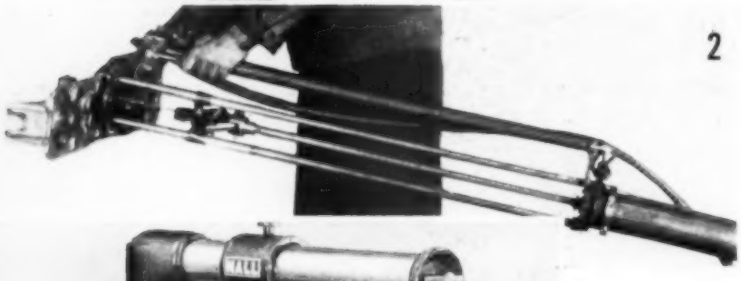
New Equipment and Supplies

(1)—Core Blower: Randall Corp., 2636 South Main St., Elkhart, Ind.—Swing-type head on this core blower permits blowing multiple cores without refilling and dispenses with the cost of extra cartridges and the many extra motions. Blow head capacity is 13 lb. The head has a 360° turning radius and is adaptable to coreboxes of all shapes. Rapid change plate measuring 9 x 10½ in. has a blowing surface of 7 x 9½ in. Air inlet is 1 in., air valves are self cleaning and machine base is 20 x 25 in. No special skill or experience is required to operate the machine.



(2)—Wire Puller: Acme Saw & Mfg. Co., 1447 East 47th St., Cleveland 3—Designed for pulling out wires from castings, this unit can be used on a bench for small castings, and for large castings which cannot be moved it can be suspended by a cable and held up to the casting. Tongue closes on wire, pulling it out of casting, automatically straightening the wire as it pulls. The tongue is mounted on slides which keep the nose piece braced away from the body. Puller is pneumatically operated; overall length is 6 ft; cylinder is 3 in. diam; stroke is 30 in., and weight is 35 lb.

(3)—Saw: Equipment Engineering Co., division of Nall Corp., 116½ West Main St., St. Charles, Ill.—Radial arm saw is accurate in any sawing position and is said to handle any sawing operation possible with heavier, more costly radial machines. Operation is simple—no complicated adjustment. Controls are all within easy reach of the operator, and machine can be set for all standard sawing operations in less than one minute. Motor carriage rides on an endless chain of hardened steel balls. Machine construction is of cast aluminum and welded pressed steel and all vital operating parts are permanently sealed against sawdust and dirt.

(4)—Testing Equipment: Adolph I. Buehler, 228 North LaSalle St., Chicago 1—A new line of Swiss-made Amsler standard testing equipment and special devices for nonstandard tests of all metals and alloys, cables, chains and other materials is being offered. Most of these testing machines are of the universal tension and compression type, constructed mainly on the hydraulic principle. Machines are available for universal testing, spring testing, combined stress fatigue testing, horizontal tensile testing, cold bend testing, ductility testing and the high frequency vibrophore which is pictured here.

Combustion Tubes: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Zirconium refractory base combustion tubes are used in carbon and sulphur analysis. They incorporate design and materials chosen and processed to give tubes which will withstand high temperatures, thermal shock and metal splatter. Other desirable characteristics are accuracy in size, gas tightness and extra long life at temperatures up to 2800 F. Tubes are available in a complete line of sizes, restricted and open ends.

Goggles: Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8—Self-adjusting welders' goggle can be raised or lowered with a nod of the head, leaving both hands always free for handling work. Known

(*Continued on page 274*)

Better Castings are Proof of Better Core Baking

Repeat orders from concerns like these prove how good CARL-MAYER OVENS really are!

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Look again at this list of users! Would concerns like these order Carl-Mayer Ovens repeatedly unless they combined outstanding dependability with speed and fuel economy?

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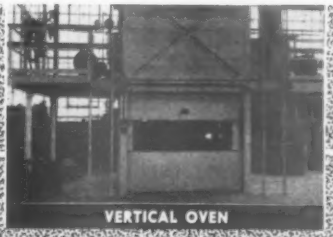
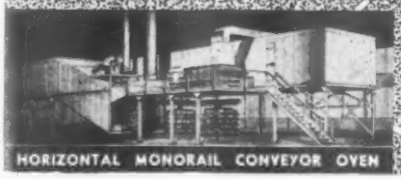

VERTICAL OVEN

CAR TYPE OVEN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CORE AND MOLD OVENS

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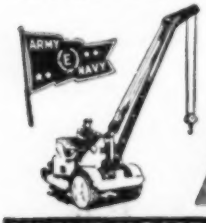

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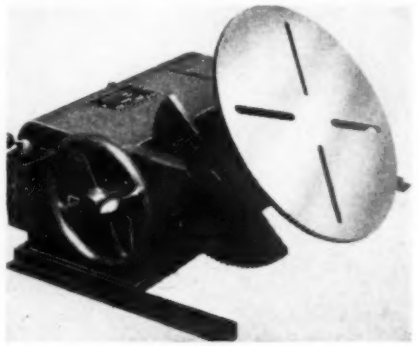
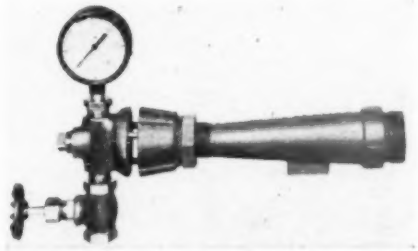
(*Continued from page* 272)

as Speedframe, it consists of suitable goggles mounted in a lightweight fiber headframe which holds goggles securely in either position without uncomfortable pressure on temples or bridge of nose. It is adjustable in three directions by side and top straps and is held in desired position by a simple screw-type clamp.

Work Positioner: Industrial Division, Ransome Machinery Co., Dept. P-27, Dunellen, N. J.—Power operated bench model positioner for work weighing up to 100 lb facilitates welding, assembling, repairing, grinding, hard surfacing and similar operations. Work may be tilted to 135° and locked in any position at any degree of tilt. It may be revolved 360° by a ⅛-hp single phase reversible motor at .21 to 5 rpm. Disengaging clutch permits free wheeling when desired.



Gas Mixer: Industrial Division, Bryant Heater Co., 17825 St. Clair Ave., Cleveland—Venturi mixer handles gases under pressures up to 35 psi to entrain all the air needed for combustion and delivers the mixture to burners at highest possible pressure. By reversing the usual operation of the air shutter and locating it on the body, the orifice spud is accessible for removal without disconnecting any piping and the orifice and air entrainment areas are readily accessible for inspection or cleaning. Available in pipe sizes from ¾ to 4 in., the mixer is suitable for use with all types of gases, including liquefied petroleum types.



Grinding Wheel: Manhattan Rubber Division, Raybestos-Manhattan Inc., Passaic, N. J.—Resin-bonded dia-

(*Continued on page* 276)

In 2 minutes you can make this little model yourself . . .

and see how

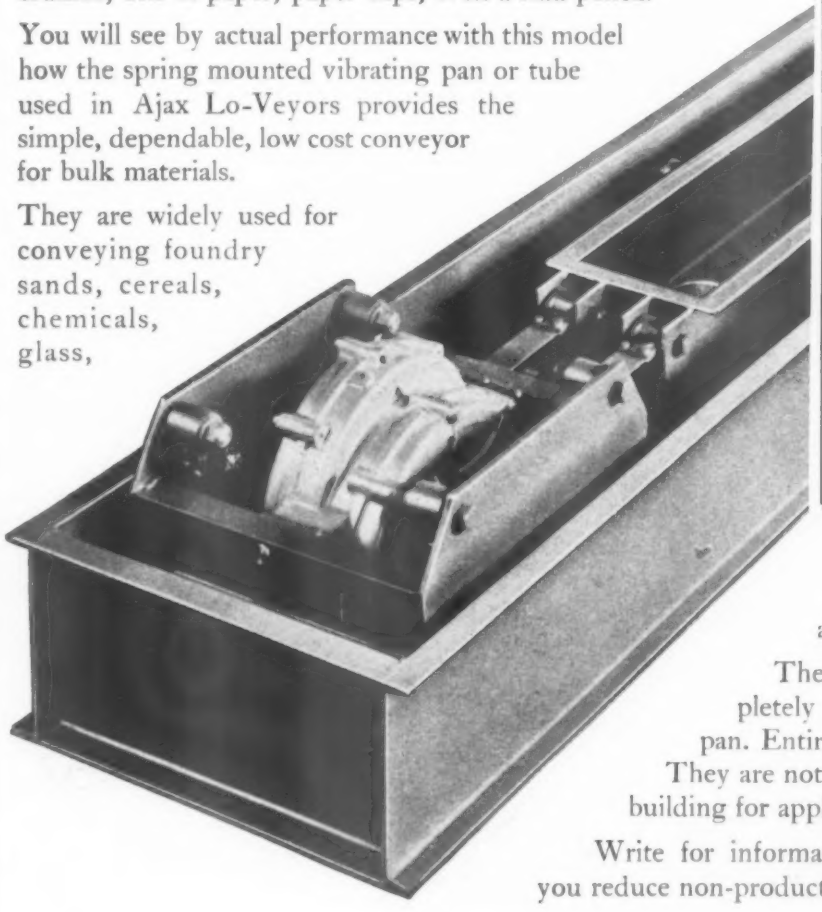
AJAX LO-VEYORS *work*

● In 2 minutes you can take a pair of scissors and a sheet of ordinary letterhead paper and fold this little model and prove right on your own desk why Ajax Lo-Veyors are so practical.

This little model will convey anything you have handy, tobacco crumbs, bits of paper, paper clips, even a lead pencil.

You will see by actual performance with this model how the spring mounted vibrating pan or tube used in Ajax Lo-Veyors provides the simple, dependable, low cost conveyor for bulk materials.

They are widely used for conveying foundry sands, cereals, chemicals, glass,

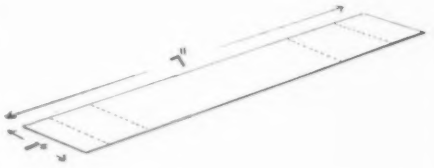


coal,—in fact, dry aggregates of most any kind.

The Ajax Shaler reciprocating drive is a completely enclosed unit connected to the conveyor pan. Entire conveyor pan and drive float on springs. They are not dependent upon heavy anchorage to the building for application of the drive force.

Write for information on how Ajax Lo-Veyors can help you reduce non-productive material handling costs.

HOW TO MAKE THIS WORKING MODEL



Cut a strip of paper or cardboard about 1″ wide and 7″ long. Fold as indicated in this sketch.

Hold the 2 short ends down on your desk or table with 2 fingers, place some tobacco crumbs or ashes or other material at one end of the conveyor and tap lightly, as indicated, on the other end of the conveyor.

Watch it run along the length of the model.

AJAX FLEXIBLE COUPLING CO. INC.

CONVEYOR AND SCREEN DIVISION • WESTFIELD, N. Y.

★HANDY? You bet!

In your foundry, a

time and work saver.

Handy for repairing surface defects—dries faster, sets harder. Try it!

Shelton Metallic Filler

Send for a liberal sample

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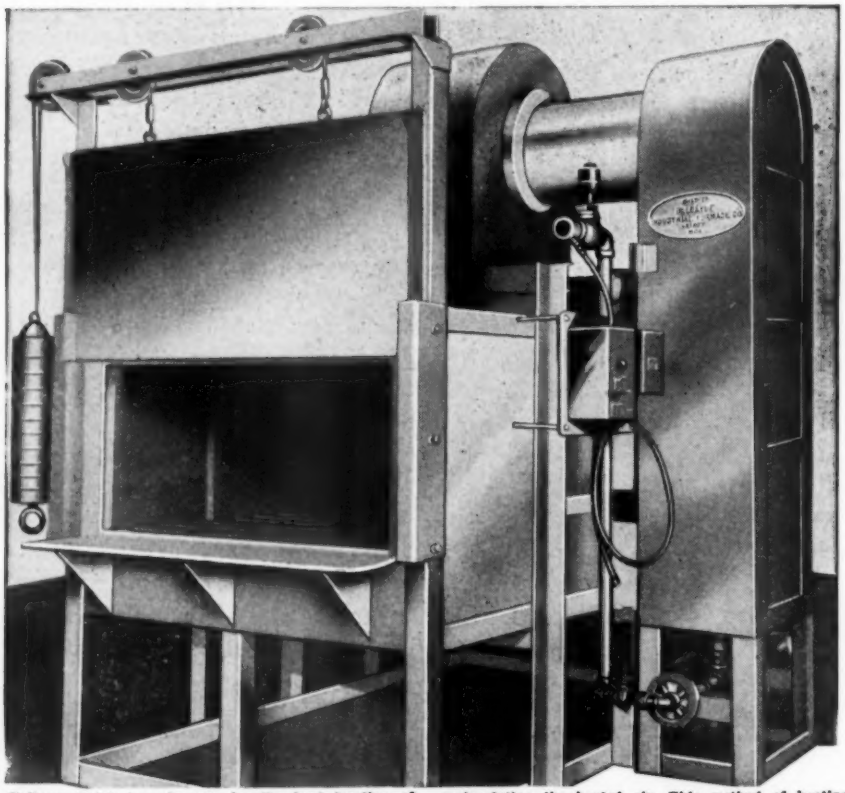
SHELTON, CONN.



Bellevue batch type furnace for the heat treating of aluminum alloys, consists of atmospheric type burner mounted on the lower end of the duct which is used for recirculating the air back into the furnace. Garden City high temperature fan is standard equipment for recirculating the heated air. This method of heating holds temperature with little or no variation. Mounting the burner in the duct eliminates the necessity of an extra heating unit. . send us your heat treating problems. . our engineers will make a proposal without obligation.

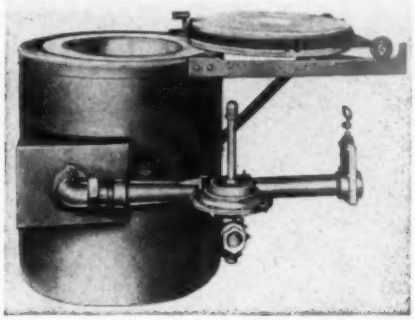
Bellevue **INDUSTRIAL FURNACE COMPANY**

2971 BELLEVUE *Since 1910* DETROIT 7, MICH.

(*Continued from page* 274)

mond wheel for grinding carbides and carbide tipped tools has a special resin bond which will not load or glaze when coming in contact with soft or hardened tool steel shanks of carbide tipped tools. Dressing or lapping in order to clean the bond is eliminated. A complete line of wheel types and shapes is available in grit sizes from 60 to 400.

Furnaces: Eclipse Fuel Engineering Co., 727 South Main St., Rockford, Ill.—Two series of gas-fired crucible furnaces are available. The "RB" series stationary furnace is designed for heavy



foundry production melting of brass, bronze, aluminum and other alloys. The "SB" series is planned for similar purposes, but incorporates an entrainment burner which accurately maintains a constant air-gas ratio over an extremely wide turn-down range. This permits a fast melt-down when required, with the ability to maintain a very low input in case holding temperature is needed. Both types are made with heavy sheet steel shell and refractory material linings.

Lift Truck: Automatic Transportation Co., 149 West 87th St., Chicago 20—Electric-lift hand truck operates with a standard-size 11-plate battery. Electric-lift pump and motor use less current than the reserve left in the foot-lift

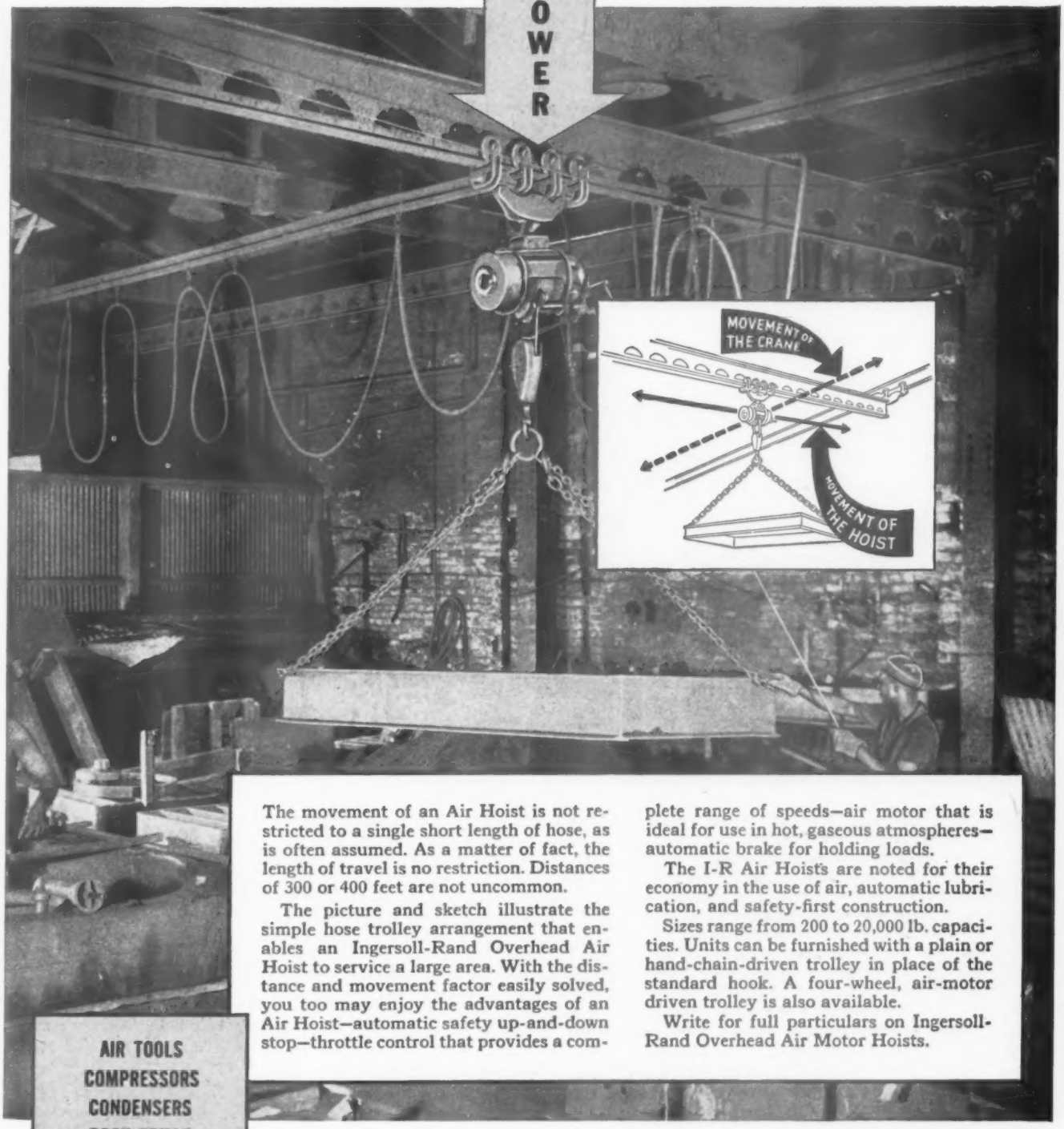
truck's 11-plate battery at the end of a full working day, thus making batteries and chargers interchangeable through-

(*Continued from page* 278)

Don't overlook the MOVE of an Air Hoist..

LIFT

LOWER



The movement of an Air Hoist is not restricted to a single short length of hose, as is often assumed. As a matter of fact, the length of travel is no restriction. Distances of 300 or 400 feet are not uncommon.

The picture and sketch illustrate the simple hose trolley arrangement that enables an Ingersoll-Rand Overhead Air Hoist to service a large area. With the distance and movement factor easily solved, you too may enjoy the advantages of an Air Hoist—automatic safety up-and-down stop—throttle control that provides a complete range of speeds—air motor that is ideal for use in hot, gaseous atmospheres—automatic brake for holding loads.

The I-R Air Hoists are noted for their economy in the use of air, automatic lubrication, and safety-first construction.

Sizes range from 200 to 20,000 lb. capacities. Units can be furnished with a plain or hand-chain-driven trolley in place of the standard hook. A four-wheel, air-motor driven trolley is also available.

Write for full particulars on Ingersoll-Rand Overhead Air Motor Hoists.

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Core Washes • Blackings
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Anti-piping Compounds
"Ferrograph" Graphitizer
Special Facings & Compound

WE WAREHOUSE

Purite • Goulac • Glutrin
Bentonite • Silica Flour
Soapstones and Talcs
Truline Binder

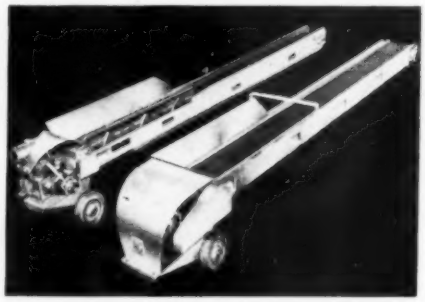
The Smith Facing & Supply Co.
1857 Carter Rd., Cleveland, Ohio

(*Continued from page 276*)

out the company's line of motorized hand trucks. This motorized hand truck is made in 4000 and 6000 lb capacity platform models and a 4000 lb pallet model.

Grinder: Standard Electrical Tool Co., 2507 River Rd., Cincinnati 4—Lightweight grinder equipped with a three-phase 1-hp motor weighs 28 lb. Motor operates at 3600 rpm and is equipped with a 6-in. diam by 1-in. face grinding wheel with steel guard. Housing is of aluminum, compactly designed with a three-pole momentary contact switch conveniently located in the handle. Ball bearings are fully protected and the cable is protected with a strain reliever. Motor housing is 5⅜ in. diam and overall length of grinder is 25 in.

Conveyor: Engineering Dept., Bosworth Engineering Co., 6723 Denison Ave., Cleveland 2—All aluminum self-powered conveyor-loader is extremely light in weight which gives it greater portability and makes it easy to handle. Heavy gage aluminum from which the conveyor is constructed makes it as



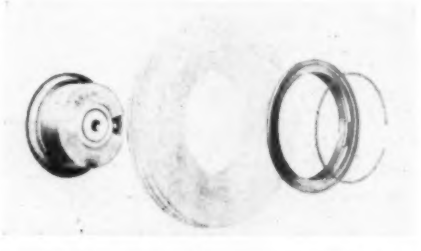
strong as steel with comparable wearing qualities and corrosion resistant. Conveyor comes in two sizes—an 8-in. belt width which handles material from sand to egg lump sizes at the rate of 40 tons per hour and an 11-in. belt width which handles all sizes of coal, sand, abrasives or comparable material at the rate of 75 tons per hour.

Welding Compound: G. W. Smith & Sons, 5400 Kemp Rd., Dayton 3, O.—Electrically conductive arc welding compound supplements fluxing action of welding rod coatings and helps produce cleaner welds. It stabilizes and quiets the welding arc, prevents arc breakage, improves fusion and prevents scale on both sides of the weld bead. It also prevents adhesion of weld spatter to parts being welded. Compound contains no combustible ingredients and therefore causes no smoke, fumes or odors. It comes in 1 and 5 gal pails as a paste which is thinned with an equal part of water and is brushed or sprayed into the seam to be welded and on adjacent surfaces where spatter usually collects under ordinary welding conditions.

Goggle: American Optical Co., Southbridge, Mass.—Lightweight all-plastic safety goggle provides wide-angle vision. Design of the eyecups, plus swivel center, enables the cups to lie back against the face, conforming closely to facial contours. Perforations at top and bottom of the eyecups ventilate the goggle and reduce fogging. Large plastic lenses, which meet high optical standards, efficiently resist the impact of flying particles. Clear and green easily

replaceable lenses are available. Frame colors are clear or green. Goggle may be worn over most types of prescription glasses.

Wheel: Aerol Co., 1823 East Washington Blvd., Los Angeles— Pneumatic wheel with detachable rim makes possible tire changes in less than one minute with no tools. Cast of corrosion-resistant aluminum alloy, the wheel has two sections—one includes the bearing carrying part of the wheel and one rim; the other, the detachable rim which slides into position over the main part of the wheel and is held in place by a special steel spring retainer ring. Wheels are equipped with factory lubricated tapered roller bearings which do not



need lubrication under average conditions during their lifetime. Wheels are available in three axle sizes—¾, 1 and 1¼ in.

Pillow Blocks: Anti-Friction Bearings Co., 2020 South Figueroa St., Los Angeles 7—Split high tensile strength aluminum housing carries spherical Naval bronze bearing. Ground adapter sleeve is inserted in bronze bearing so that one basic pillow block can serve a number of shaft diameters. After

shaft has been located, housing is clamped on spherical self-aligning bronze bearing giving a rigid bearing for taking either radial or thrust loads and handling speed up to 5000 rpm. Line includes sizes from ⅝ to 3 in. shaft diameters in both pillow blocks and flange units.

Hoists: Robbins & Myers Inc., 1345 Lagonda Ave., Springfield, O.—Monorail hoists use two-speed squirrel cage induction motors which are especially adapted to such foundry operations as withdrawing patterns, setting large cores, closing molds, etc. Absence of slip rings or brushes in the squirrel cage type motor and the totally enclosed motor construction simplify maintenance. Hook speed variation irrespective of load is very slight. Two-speed reversing switch controller is mounted on the hoist and controlled from the floor by pendant ropes. Ratio of the two speeds obtainable may be varied over wide limits. Motor speeds most commonly used for 60 cycle current are 1200 rpm and 360 rpm and for 25 cycle are 1500 rpm and 375 rpm.

Melting Pot: Kindt-Collins Co., 12651 Elmwood Ave., Cleveland 11—Fifty-pound capacity melting pot is suitable for aluminum, white metal, zinc and similar metals. It is cast from a special alloy to obtain greatest life and is

normalized to prevent cracking. It is claimed that 200 heats can be obtained from each pot with reasonable care. Use of two-man bale permits pouring of metal from same pot in which it was melted.

Electrode: Air Reduction Sales Co., 60 East 42nd St., New York 17—Complete line of stainless steel electrodes in a full range of grades and diameters is available. They are furnished with a heavy extruded lime type coating for dc application, and all but the straight chrome analyses are obtainable with a lime-titania type coating usable on ac or dc. Slag produced by either of these coatings is easily removed.

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For efficient low-cost handling of foundry raw materials and castings with magnet (scrap, castings) or bucket (sand, coal, coke). Manpower-saver in yard or plant, flexible performance, built for years of overwork. Write now for the money-saving facts.

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Don't let your foundry get "hooked" by bent core rods that are not being put to useful work. Hundreds of shops have found the American Rod Straightener an excellent means of putting bent core rods back into production. The use of this machine eliminates unnecessary hand labor . . . straightens bent rods quickly and easily . . . with one blow. Any employee can operate the machine, turning out work as fast as material is fed into it.

The machine is available in four different sizes to meet any foundry requirement. Besides straightening bent core rods it shears them quickly and accurately, and with the gagger attachment it forms perfect right angle gaggers.

Set up a Rod Straightener in your foundry . . . it takes only a few square feet of floor space. See how this industrious machine makes that old scrap pile pay dividends.

We will be glad to send you Bulletin 10-A, covering in full detail the features, specifications and advantages of this machine.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St. Mishawaka, Indiana
CORE ROD STRAIGHTENER

BIRMINGHAM

(*Continued from page* 159)

ners. Investment material is reclaimed, as also are gates, etc.

Mr. Sellas displayed a variety of castings which have replaced more costly parts machined from solid material, or which represent parts not possible of duplication by any other method of fabrication. Although investment casting still is limited commercially to relative-

Top panel shows AFA President S. V. Wood addressing a luncheon meeting at the Birmingham conference. In center, L. D. Pridmore, International Molding Machine Co., is shown addressing one of the technical sessions with J. E. Getzen, H. G. Mouat Co., at left and E. M. Whelchel at right. At bottom is scene of the registration desk in the lobby of the Tutwiler Hotel, Birmingham

ly small pieces, Mr. Sellas stated that development work is in progress looking to the production of considerably larger sizes.

Concluding the Thursday afternoon technical session, Raymond Foster, Lynchburg Foundry Co., Lynchburg, Va., described his company's use of a new development in foundry sand practice—a chemically treated molding sand. Mr. Foster first showed slides illustrating the variety of gray iron castings currently being produced by the Lynchburg company, these ranging in size from 3½ to about 350 lb.

A short time ago the foundry's sand system was changed over to use sand treated with Westonite, a product of Foundry Development Engineers Inc., Detroit. Lynchburg is the first company to have adopted this type of sand treatment. The base sand is No. 60 New Jersey grade. The chemical—a resin dissolved in a solvent—is mixed with equal parts of water and added in the muller. It does not entirely supplant cereal and clay binder additions. Principal benefits resulting from use of the chemically treated sand, according to Mr. Foster, are: Reduction in mulling time; increased flowability of sand; curtailment in number of jolts required to attain desired mold hardness; elimination of mold facing; cleaner shakeout with decided absence of sand lumping; better casting finish and faster cleaning. The sand is said to be adaptable to production of a wide range of casting sizes.

Cellulose Improves Flowability

In the ensuing discussion it was brought out by E. H. King, Hill & Griffith Co., Cincinnati, that successful development work has been under way in the use of finely ground cellulose as an addition to molding sand to provide improved flowability and reduced ramming. Mr. King indicated that both this and the chemically treated sand development make it necessary to revise some previous convictions regarding molding sand practice.

Charles K. Donoho, American Cast Iron Pipe Co., was chairman for this part of the session.

First of the two concluding technical sessions on Friday afternoon was a discussion on "Some Alloy Irons for Wear and Corrosion Resistance," presented by Fred G. Sefing, International Nickel Co., New York, with E. A. Thomas, Thomas Foundries, presiding. Pointing out that grain structure is the important consideration in selecting an iron suitable for wear resistance, Mr. Sefing illustrated various types. These included a dendritic graphite pattern and the ferrite with coarse graphite, both of which give poor wear resistance. In a good wear

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Pipe Size	Price FOB Hamilton, O.
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3/8"	12.00
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and gall resistant structure the pearlite extends up to the AFA type A graphite. The correct type of structure for wear resistance can be attained with thorough and accurate inoculation. White iron or alloy additions will provide desired abrasion resistance.

For attaining heat resistance chromium is the best alloy, but to produce maximum resistance to corrosion, service requirements will dictate the choice of the most effective alloy addition. At the same time, Mr. Sefing emphasized that it is not always desirable to attempt to attain maximum resistance to corrosion. In some cases it may be more economical to replace a part occasionally than to provide a relatively expensive casting originally. Study of the kind of service to be experienced is necessary before deciding on the most appropriate iron to be applied. For moderate improvement in corrosion resistance properties of gray iron a wide selection of low alloy additions is available; for severe exposure conditions the high alloy materials become necessary.

Control Numerous Variables

W. B. McFerrin, Electro Metallurgical Co., Detroit, concluded the technical program with a paper on "Cupola Melting of Gray Iron." Ned Brandler, of the same company at Birmingham, presided. Mr. McFerrin gave a thorough review of what goes on inside the cupola during melting and offered various recommendations for controlling the numerous variables which affect the quality of the metal. He pointed out that intelligent use of various auxiliary equipment can aid tremendously in producing better and more uniform cupola metal, but that the best of equipment will not make up for lack of understanding of the basic principles involved or for carelessness and lack of attention to detail. No matter how much or how little equipment is used in cupola operation, the final results depend on the men doing the melting and on standardized methods. Mr. McFerrin's recommendations for successful cupola operation included the following:

1. Inspect the coupola lining from the previous day's run, to determine whether there was any abnormal operation.
2. Check the weighing scales.
3. Inspect raw materials to be used that day, especially the scrap.
4. See that the wood is of reasonable size, properly placed on the sand bottom and thoroughly lighted.
5. See that the first coke is thoroughly lighted.
6. Bring the bed up to standard height. If the bed is not at the correct height or improperly lighted, faulty castings are certain to result. The best height can be determined experimentally by starting at some arbitrary figure, say 42 in., and increasing or decreasing the height, as the case may be, day by day until good hot iron comes down every day.
7. Start making chill tests with the first ladle and continue during the entire run.
8. Avoid shutdowns and changes in speed of melt as much as possible. When a shutdown is necessary, add extra coke to take care of the burning out of the bed.
9. Avoid special charges during the day's run. If possbile, run special charges the last thing.
10. Have the best man available on the charging floor.
11. Watch the slag. If it is very black, it is high in oxides and may mean excessive blast or oxidized material in the charge. A white or gray slag usually indicates too much lime rock, and this should be reduced.
12. Keep records of all factors entering into the metal operation, preferably hourly records of all the variables.

ALL CANADIAN CONFERENCE

(*Continued from page* 178)

peace. On the subject of contracts he quoted several case histories to indicate the necessity of closely studying not only the main features, but the several apparently innocuous clauses usually in small print. Vague, ambiguous wording in many contracts, absolutely prevent a court or a board of arbitration from arriving at a clear cut decision in a dispute.

History of the AFA purpose, aim and objects and list of accomplishments formed part of the address delivered at the noon luncheon Saturday by W. W. Maloney, national secretary-treasurer. He stated that the present membership is approximately 9000 with many members in foreign countries. As the title indicates the bulk of the membership is in North America with 33 chapters in the United States, two in Canada and one in Mexico. The speaker described the organization and operation of the technical and practical committees and the hundreds of foundrymen and suppliers who serve voluntarily on these committees to improve foundry practice and casting quality.

At the first technical gray iron session under the chairmanship of G. Ewing Tait, Dominion Engineering Works, Montreal, a paper on gates and risers was presented by William Bradley, superintendent, Enterprise Foundry Co., Sackville, New Brunswick. A second paper on cupola operation was pre-

sented by E. N. Delahunt, superintendent Warden-King Co., Montreal. Both papers provoked considerable discussion. In his introduction to the subject Mr. Bradley pointed out that the gate should allow the metal to flow easily into the mold and bring the hottest metal to the heaviest section of the casting. The riser should be placed on the heaviest section to insure progressive solidification and should be as large or larger than the section to be fed. Gates should be large enough to enable the metal to enter the mold as fast as possible, but still small enough to prevent entrance of slag, dirt or other foreign material. A number of slides were shown to illustrate methods of employing gates and risers on a number of typical castings.

Start the Fire Properly

Discussing cupola operation Mr. Delahunt emphasized the importance of starting the fire properly and the necessity of drying the daubing material before starting the blower. He claims that with all the information now available in the form of articles in the technical press, the standard works by Dr. Moldenke and J. E. Hurst, and the recently issued *Cupola Handbook* by the AFA, there is no excuse for sloppy or inefficient operation of the cupola. However, he pointed out that, as in many other activities, a theoretical knowledge of the subject is not sufficient. Careful supervision is required to insure the carrying out of instruction by the cupola crew. Touching on the subject of adapting operations to changed conditions he stated that for many years steel was not employed as a component of the cupola charge by firms engaged in the production of boilers, radiators, soil pipe and fittings. Under stress of economic conditions experimental charges containing approximately 10 per cent steel scrap were tried. Results were so satisfactory that steel has been recognized as a regular part of the cupola charge.

With Harold J. Roast in the chair—and as usual chief spark plug—a lively discussion over a wide range of nonferrous topics followed the presentation of a paper, "Metallurgy in the Foundry," by James G. Dick, chief chemist and metallurgist, Canadian Bronze Co. Ltd., Montreal. The paper was a development of a theme that the metallurgical department, in the main is not concerned with the actual operation of the foundry. It exists for the purpose of maintaining proper control over the composition and quality of the product, also as a source of information and guidance in such foundry problems as lie within its scope. Services only can be used to the best advantage where a system of close co-operation exists between the technical and operating staffs.

At the afternoon nonferrous session

Maple Mallets, fillets, hardboard for templates and lagging, dowels and boards. Skids and crating for large castings and machinery.

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under the joint chairmanship of Dave Sunnocks, chief metallurgist, Aluminum Co., of Canada, Ltd., Etobicoke, Ont., and G. O. Loach, sales engineer, Electro Metallurgical Co. Ltd., Welland, Ont., Dr. Gordon Farnham, International Nickel Co., presented an interesting report on the nonferrous field in Germany, as observed in a recent visit to that country. Near the close of the session Mr. Roast demonstrated an abbreviated method of figuring costs, developed and applied while serving as vice president, Canadian Bronze Co., Ltd. At the luncheon preceding the meeting Mr. Roast announced his retirement as of Mar. 1, to take up residence in California.

E. F. Viberg, works manager, Canadian Car & Foundry Co. Ltd., steel foundry division, Montreal, presided at a steel foundry session at which Willett Tibbits, assistant superintendent, open hearth, Canadian Car & Foundry Co., presented a paper on "The Manufacture of Acid Electric Steel for Castings." At the second session under the chairmanship of Morris Holland, metallurgist, Fittings Ltd., Oshawa, Ont., Turney Shute, assistant superintendent, steel foundry, Canadian Car & Foundry Co., presented a paper on the subject of internal risers for steel castings. A chart system based on mathematical formulas for solving problems involving variable factors in shop operation, was described and demonstrated by Richard Freeman, Canadian Westinghouse Co., Hamilton, Ont., under the chairmanship of Reginald Williams, foundry superintendent, same company.

Chairmen of the various convention committees include: Art Hawthorne, programs; Henry Ashton, banquet and luncheons; Jack Richardson, registration; Jack King, housing; Russ Woods, entertainment; Charlie McDonald, plant visitation; Burn Morris, transportation; Murray Tallman, secretary; R. C. Tiplady, publicity.

PRESSURE CASTING MATCHPLATES

(*Continued from page* 126)

moved. The thermal shock, to which the mold would be subjected upon removal from a hot oven, would ruin the mold.

A wet mold can be placed directly into a hot oven without danger of injury to the mold. A burned-out mold must not be allowed to stand in the open air for any length of time before introducing the metal since it will readily reabsorb moisture from the air and an unsatisfactory casting will result. In general, to maintain the precision required for plate work, heat treatment is best done by maintaining baking temperatures between 350 and 400 F. Overbaking tends to cause the plaster to shrink away from the flask, with possible mismatch if the shrinkage is severe.

An alternative suggested procedure for providing an exact match of drag piece-molds on those of the cope which eliminates the use of brass pins and locating

Some of the participants in the Canadian conference. Front row, left to right: Henry Louette, chairman, Eastern Canada and Newfoundland Chapter; Sheldon V. Wood, president, AFA; William W. Maloney, secretary, AFA. Back row, left to right: A. E. Cartwright, vice chairman, Eastern Canada and Newfoundland Chapter and J. Dalby, vice chairman, Ontario Chapter

holes, is the employment of individual gypsum patterns. These are made from a set of cope and drag piece-molds with a suitable opening for pouring in the liquid gypsum. After drying the gypsum patterns are placed in the cavities in the integrated cope mold. Then the drag piece-molds are set in the proper positions by locating them on top of the exposed portions of the patterns. Combining the assembled drag piece-molds into a single mold is accomplished by placing a flask around the assembly and pouring in the liquid gypsum composition as previously described.

Pour Molds While Warm

When the molds are dried completely they are removed from the oven and placed on a bench or table in preparation for pouring. That operation should be performed as expeditiously as possible since the molds should be poured while they still are warm. The reason for such an arrangement is that, as previously mentioned, the gypsum absorbs moisture rapidly on becoming cold which may result in defective castings. The pouring bench or table may be of any suitable construction. One in common use, shown in Fig. 4, is comprised of a cast iron top about 1½-in. thick which is planed to provide a smooth surface. Legs supporting the top are formed of 1½-in. steel pipe. Top of the table shown is about 18 in. above the floor which provides a satisfactory height for working on the molds preparing them for pouring, and after assembly and attachment of the metal reservoir permits pouring without too high lifting of the ladle. Table top must be level, and care must be taken to be sure that it remains so. Successive pours may cause a warp unless it is cooled.

Separating or spacer strips are placed along the edges of the drag mold. These strips are formed of asbestos board ¼ or 5/16-in. thick, and provide the necessary separation between cope and drag for the metal thickness of the matchplate. Separator strips for the sides usually are straight while those for the ends are contoured to form the ears or projections to which the guide pins will be attached.

With the separating strips in place on the drag the cope mold is placed in position, and a cast iron top plate about 1¼ in. thick is set on top of the assembly. The top plate is the same size as the pouring table top, and is clamped to the latter by a number of adjustable steel patternmakers' clamps as shown in Fig. 4. Care must be taken to clamp the molds uniformly all around. As may be observed in the illustration the top plate contains a projection or bulge on one side similar to that on the flask and mold to permit attachment of the metal

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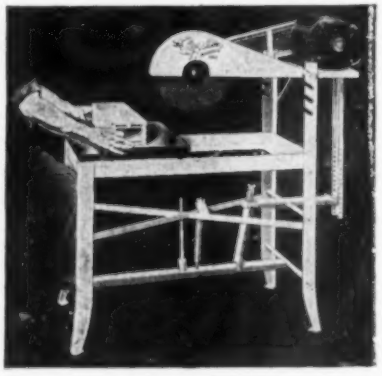

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reservoir. The latter is about 8 in. in diameter and 12 in. high and will hold about 60 lb of aluminum. However, that capacity seldom is required since the average matchplate seldom requires more than 20 lb. The reservoir may be lined with a thin calcined gypsum sleeve or thin asbestos paper, or just given a wash coating to prevent any possible sticking of metal. Such wash coatings may be composed of whiting or clay in water with a little sodium silicate as a suspension agent. Asbestos and other ingredients also may be incorporated.

Previous to pouring the metal into the reservoir, a piece of 1/16-in. asbestos paper is placed over the sprue to prevent entry of the metal into the mold until all of it is in the reservoir. Temperature of the molten aluminum as poured into the reservoir is around 1250 to 1275 F. It is allowed to remain in the reservoir until it cools down somewhat to what the matchplate makers term the "mushy" state. In other words it is permitted to cool to the lowest possible temperature at which the metal still will flow and completely fill the mold cavity. As might be expected such knowledge is gained by experience.

Apply Air Pressure

If pressure is to be applied on the casting—and it usually is—a cap attached to the compressed air line is fastened to the top of the reservoir, and a pressure of 4 to 6 lb, or as low as experience indicates will fill the mold completely, is applied. This additional pressure is sufficient to break the asbestos paper over the sprue, and to force the low temperature metal into the casting cavity. Molds may be filled without the use of pressure by simply piercing the asbestos paper with a rod or stick. However, in that case the metal must be at a higher temperature than in the case when pressure is used.

Instead of using a metal reservoir a calcined gypsum sleeve or cylinder with 1-in. wall thickness may be employed. A sleeve of 4 in. internal diameter will hold 1¼ lb of aluminum per inch of length while one 5 in. in diameter will hold 2.75 lb per inch. If such sleeves are used they should be dried thoroughly and used while still warm to eliminate any reabsorption of moisture.

The materials used to make these molds are a combination of gypsum plaster and a fibrous talc. The proportions are generally 80 parts of special gypsum plaster to 20 parts talc (both by weight). The mix is made at a very high consistency (water to plaster ratio). This water to metal casting plaster ratio varies from shop to shop and also varies somewhat according to the base materials used. Generally a proportion of 14 lb water to 10 lb gypsum plaster is mixed long enough to cream properly. When this is done, the plaster does not settle out of the mix, which setting may cause a variance in mold density from top to bottom.

The completely formulated material can be purchased from the major gypsum companies, under names such as matchplate plaster and metal casting plaster or the base material and the fibrous talc can be purchased separately and mixed by the user.

WHERE ARE THE TOY BANKS OF YESTERYEAR?

(*Continued from page* 119)

screamed." The late 1880's, when the American mechanical bank reached the zenith of its glory, also marked the appearance of the phrase "dollar diplomacy."

All through the early 20th century, as American bank balances reached unprecedented heights, thrift and savings were taught assiduously in home and school. It is significant that about the last of the new patents for toy savings banks appeared in 1929, the end of the economic era. Few banks are sold over toy counters today. The weekly bankday collection of children's savings in the class room has become discredited, due to the one time failure of many banks which once were depositories of school savings. The latest bank that we have seen characteristically makes its appeal to Uncle Sam as the guardian of our hoardings rather than to the private bank. Toy containers, and especially banks, are thus destined to become a distinct memoir of the youth of the 19th century America. A history of toys written from the standpoint of any other country would not have found need for a special chapter on banks.

After 1860 tin banks gradually came to be replaced by banks of cast iron. This material made for sturdier banks; also, owing to its greater tractability could be produced in a greater variety of interesting shapes. Patterns portrayed not only houses, but birds, human beings and animals. Historic objects such as the Liberty Bell and Bunker Hill monument were made in the form of banks. These banks usually were made in two pieces bolted together. It was not necessary to break the bank to get the money out. All that was needed was to unscrew the bolt. As this was not a job for a child, the parent was able to watch over the distribution as well as the acquisition of pennies.

Most of the *still* cast iron banks now

available were made in the late 19th century and the early 20th century, but a few antedate the mechanical variety of cast iron bank. As none of these was patented it is hard to trace their history or place of origin. The safe-type bank, in which money is removed only by working a combination of the door, appeared around 1895 and was popular well into the 1920's. In the 20th century patents have been taken out for adding sound to still coin receptacles. Few of these have seen the market; nor are banks which light up or ring bells upon deposit of the coin, frequently found.

Typify Thrift and Ingenuity

Mechanical banks of the 19th century represent the union of two fundamental traits of the American Yankee, his thrift and his ingenuity. In the medium of cast iron there appeared a host of action toys which could be operated properly only by insertion of a penny.The purpose which lay behind these elaborate coin receptacles was that children could be lured into the habit of thrift by their curiosity to see the thing work. It is said that this sugar coated method of saving appealed to children. At any rate it did to their parents who bought these mechanical banks in large quantities. Designers vied with each other in the creation of new and startling effects, until in some, the depositing of the coin became but a minor consideration to the feats of movement performed by the cast iron figures of men and animals which overlay the coin receptacle. The subjects of many such banks appealed as much to adults as to children. They became another example of the outpouring of popular art along with cigar store Indians and Roger's Groups. In this unsophisticated art which appeared in the late 19th century, one can detect that handicraft of real craftsmen coupled for the first time with the machinery of mass production.

What is the oldest mechanical bank? Some persons on the questionable authority of personal reminiscence say that the Uncle Sam bank appeared in the 1850's This was indeed a popular early bank and several companies showed it in their 1870 catalogs. If we are to accept the evidence of patent files, the lever system which is basic to this bank was not developed until the 1870's. The first mechanical bank to be patented (and the great majority were designed so as to be protected by patent) is ordinarily not to be thought of as being in this class. It is a house bank called *Hall's Excelsior* and it makes no use of the elaborate lever, spring and clockwork arrangements characteristic of the later varieties. The patent (No. 98055) was taken out

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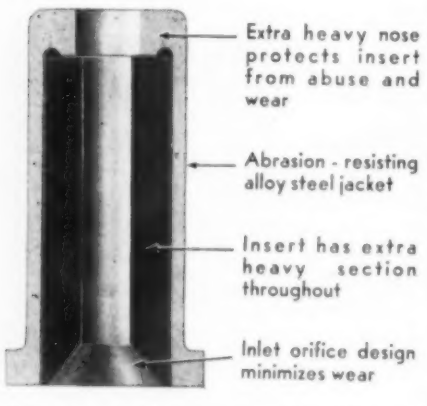
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by John Hall, Watertown, Mass., Dec. 21, 1869. The patent feature includes a simple balance mechanism located in the roof of the cast iron house, so arranged that when a cupola hatchway is lifted, there is revealed a small figure standing behind a desk. The weight of a penny placed on this desk causes the figure, and penny, to tip forward into the bank. The cupola hatchway then is closed.

Hall made a large number of these banks and they were distributed widely throughout the country. However, we never have seen any in which the man figure (like the patents) was used. Instead there is a tiny monkey, and in some of the later ones the balance hatchway is pulled shut by an attached spring. Perhaps this was added to compensate for the lighter weight of the later one-cent pieces. Hall perfected and made a number of other early mechanical banks, including the bank variously called *Fat Man, Boss Tweed* or *Tammany Bank*. His work does not appear in any period after 1880.

Designed Many Banks

J. H. Bowan, Philadelphia, was one of the most ingenious and prolific designers of mechanical banks. To him are credited such well known banks as *Creedmore, Kicking Mule, Bulldog,* and *Monkey and Coconut*. Apparently he made his model, and often the casting dies, and then sold these to some manufacturing company, such as the J. & E. Stevens Co., Cromwell Conn.

Other famous designers were F. Frisbee, who appears always to have been associated with the Stevens company, and C. G. Shepard, Buffalo, who designed and marketed the *Jolly Nigger* coin swallowing banks and a number of other related types. Not all banks which were patented appear to have been made, and not all banks in existence can be traced to patent sources. Many banks used the same mechanical principles; this is illustrated by the variants made from the basic *Creedmore* design. The original of this bank was produced by the Stevens Co., in 1877. The second variety was the *Tyrolian* (1877), then came the *Grenadier* (1878), *Volunteer* (1880), *Indian and Bear* (1888), *William Tell* (1896), *Lion Hunter* (1900), *Teddy and The Bear* (1902).

The company most active in mechanical bank production was the J. & E. Stevens Co., of Cromwell, Conn. This iron foundry in 1870 was the first to make moving parts for juggling the penny. Within a few years it was offering no less than 21 distinct patterns to the trade. Its banks are distinguished by patented coin traps. Kingsbury of Keene, N. H.; Hubley of Lancaster, Pa.; Enterprise of Philadelphia; Shepard of Buffalo and Kenton Hardware of Kenton, O. are other famous makers. Old trade catalogs, hard to find, are the surest way of identifying the maker. Few banks are marked by the maker. Many times where they could chance it, several companies copied the bank of a successful competitor. Usually banks were made to retail from $1 to $2 with $4.50 as a top price for a few of the more complicated action toys, such as the Freedman's bank.

Little has been written about the actual construction of mechanical toy banks, but one famous designer, Bowan, has left this record of his creations in a letter to the Philadelphia *Times* of 1885: "The *Creedmore* bank was the first I made," said the bank maker. "That was followed by the *Kicking Mule* the *Bulldog* and others. I am now at work on a more complicated toy bank. The first bronze casting has just come in. We are now chasing it and filling down all the rough edges, and making all the joints work easily. First of all I make a solid model of the figure in specially prepared ways (wax) From this I take a plaster of paris mold in two parts. Then I make two hollow models of the figure in wax from these molds. The next thing is to separate from the complete models the parts which are intended to be movable.

Patterns Cast in Bronze

"Before me I have the left fore arm and hand of a monkey, holding up a piece of a coconut shell, the thumb of the right hand, the lower jaw, the eyes and the tail which, when the toy is complete, will act in conjunction with a spring on the inside. These parts being removed, I have to make a fresh model in wax of every part, with an end or joint attached to them. They are then sent to the brass foundry to be cast in bronze. The whole figure has to be made complete and working in wax before it goes to the foundry. When they come back some of the pieces are very rough and need a great deal of filing and chasing to make them fit and move easily. The model in bronze that I make is the foundation from which all the banks eventually are to be made and unless my model works perfectly there will be no end of complaints when it goes eventually to the iron foundry, where the marketable toys are turned out."

The foregoing comment was written in the heyday of the mechanical bank, when the production was news. Over 30 patents were issued in the year 1880. Onward from 1885, gradual deterioration took place. The bank became more elaborate, less interesting and not in great demand. The last of the mechanical banks

appears to have been advertised around 1908, so that the total span is not much more than 35 years.

The distinctive character of mechanical banks has provided a unique field for the collector, over 300 having been made. Each bank can be given a distinctive name and its variants gradually can be tracked down. To one who is not interested in providing a mere check list, several means of classification as to type may be used. One is according to mechanical action, but most banks are lever-and-spring operated, and only a few can be placed in the other class of clock-work operation. Another suggested classification is according to rarity, but as the question of rarity bears no relation to age or action type this would not be especially fruitful. A classification that is fairly common with collectors rests upon the object or central idea of a bank. Upon such a basis one may discern the following types: Negroes, Bank Tellers, Symbolic Figures, Caricatures, Animals, Carnival Themes, and Memorial Banks. Famous caricatures banks include the *Tammany* or *Boss Tweed* bank, and the *General Butler* bank, which portrayed the presidential candidate of the 1884 Greenback Party as a monstrous frog. The animal and carnival theme banks show on the whole the greatest diversity of treatment. Several memorial banks were issued at the time of the 1876 Centennial in Philadelphia. Also for the Columbian and Pan-American expositions which followed.

Another and final method of classification is according to age. 1—Those of the early 1870's when the mechanical bank was new. 2—Those of the 1880's when the bank was generally popular. 3—Those of the 1890's and 4—Those of the 1900's when the bank had begun its decline in popular favor.

During the 1870's the bank was at its best from child's standpoint. Simple in design without superfluous ornament, they all make obvious appeal to use the penny. The little *Fat Man* puts the penny in his pocket. *Uncle Sam* puts the penny in his valise. The *Mother Eagle* bends forward and feeds the penny to her young. The *Soldier* shoots his penny from a cannon into the fort-like safe.

(To be concluded)

Editor's Note: Historical dates and other interesting data presented here are taken from *Cavalcade of Toys* through the courtesy of the authors, Ruth and Larry Freeman, and the publisher, Century House, New York.

Superior Aluminum Foundry, 1229 W. Cortland St., Chicago, suffered severe damage to its plant Feb. 12 when a fire which destroyed two buildings of an adjacent ice plant spread through its property.

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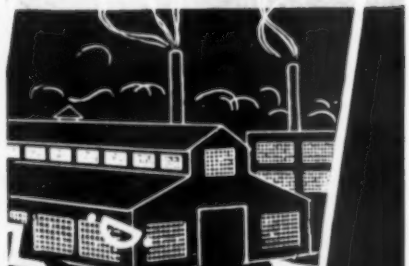

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NEW TRADE PUBLICATIONS . . .

MANAGEMENT CONTROL: Remington Rand Inc., Systems and Methods Research Dept., Systems Division, 315 Fourth Ave., New York 10—32-page booklet, "Dynamic Management Control With Sched-U-Graph," describes the practical chart-board application of time control principles. It demonstrates the system's advantages as applied to loading and scheduling of machines, men, or work center; scheduling continuous production by operations; scheduling actual against required production with visual indication of leads and lags; and other managerial problems.

INDUCTION HEATING: Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.—Small 3 and 6 kw spark-gap converters, used for a wide variety of induction heating, brazing, hardening, and melting applications, are fully described in bulletin 12-A. Advantages, principles of operation, specification and performance data are covered. Melting furnaces and heating coils for use with these small converters are also described.

MATERIAL LEVEL INDICATOR: Fuller Co., Catasauqua, Pa.—Booklet describes electrically operated material level indicator which may be used to indicate or control the level of dry pulverized, fine, crushed and granular materials passing into or out of a bin or bunker, or through a conveyor or spout. It may be used to control or operate a feeder, valve, elevator or conveyor by starting or stopping the motor driving equipment when a predetermined material level is reached.

CORE BAKING: V. L. Smithers Laboratories, 2706 First Central Tower, Akron 8, O.—Results of an exhaustive study of high-frequency dielectric baking of foundry cores will be published in nine monthly reports. Experiments already conducted with thermosetting binders have produced good, usable cores in the laboratory in 1/10 to 1/20 of the time required with old type binders when baked in an oven. Results of the study will be sold at $20 per report.

FIRESTONE: Cleveland Quarries Co., Builders Exchange Bldg., Cleveland—Bulletin 15-B contains descriptive information and technical data on natural firestone for lining soaking pits, bessemer converters, blast furnace ladles, mixers, cupolas, malleable furnaces and drop forge furnaces.

TRACTORS: Caterpillar Tractor Co., Peoria 8, Ill.—The use of diesel-powered tractors on tasks that require mobile, flexible power around industrial plants is described and illustrated in a 20-page color booklet No. 9778. Action photos and informative text is combined to suggest possible uses of the equipment.

TESTING MACHINES: Steel City Testing Machines Inc., 8843 Livernois Ave., Detroit 4—Catalog page describes new model transverse testing machine with 10,000 lb capacity. Other company manufactured machines include six models of brinell testing machines comprising manually operated and portable types and a universal model that may be adapted to tensile, traverse and compression tests up to 60,000 lb. Catalog sheets are available on these also.

METALLIZING: Fulton Foundry & Machine Co. Inc., Morgan Ave., at East 75th St., Cleveland 4.—Use of the metallizing process—the spraying of molten metal on a properly prepared surface—for the possible salvaging of machine parts and other equipment that has become worn is illustrated and explained. Another folder tells how Meehanite has been used to increase the work capacity of large industrial machinery and give more assurance of satisfoctory service to users.

WELDING ROD: Welding Equipment and Supply Co., 223 Leib St., Detroit 7—6-page illustrated folder gives physical properties, heat-treatment and uses of the company's high speed welding rods. Welding procedures are outlined in using these rods for repairing high speed steel cutting tools and for compositely fabricating cutting tools to create cutting, wearing and bearing surfaces.

WELDING: Ampco Metal Inc., 1745 South 38th St., Milwaukee 4 — Bulletin W-2A, "welding technique," features the welding of aluminum bronze electrodes by the carbon and metallic arc methods and contains a weldability chart for copper base alloys, listing 33 bronze alloys, their chemical composition, physical properties and detailed weldability data.

FURNACE: Stroman Furnace & Engineering Co., 9900 Franklin Ave., Franklin Park, Ill.—Bulletin 90 describes company's line of gas or oil fired furnaces with capacities from No. 20 to No. 400 crucibles. Suitable for melting bronze, aluminum and other alloys, these stationary melting units are available with push back, swing and counter-balanced covers.

PALLET LIFT TRUCK: Lyon-Raymond Corp., 3102 Madison St., Greene, N. Y.—Bulletin 220 describes hydraulic pallet lift truck for double-face and single-face pallets. Illustrations show method of operation with pallets, recommended pallet construction and adaptability of various materials to palletizing.

CONVEYORS: Rapids-Standard Co. Inc., Dept. BC-125, 308 Peoples National Bank Bldg., Grand Rapids 2, Mich. —32-page catalog contains descriptions, photographs and specifications of the company's entire line of power belt conveyors. Photographs of equipment installations are included.

PUMPS: H. K. Porter Co. Inc., 1932 Oliver Bldg., Pittsburgh 22—Bulletin 300-A describes close-coupled centrifugal pump for general service with capacities from 10 to 100 gpm. Selection and specification tables are included.

CUTTING MATERIALS: Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22—Booklet analyzes impartially the comparative fields of usefulness of high speed steel, cast alloys, and car-

bides as cutting tools. Its objective is to correlate comprehensively the basic characteristics, properties and functions of the three broad types of cutting materials.

CO ALARM: Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8—Bulletin DG-3 gives information about a carbon monoxide alarm designed for protection against dangerous concentrations of the gas in the air. Unit continuously samples surrounding air and uses no more current than a 100-watt bulb. It gives both a visible and audible warning when a predetermined meter setting is reached. Description is also given of an instrument designed to control carbon monoxide in ventilating systems.

DUST COLLECTION: Whiting Corp., Harvey, Ill.—Bulletin FY-142 covers the general and technical aspects of dust collection. Hoods, orifice loss, pipe resistance, fans, air pressures and many other pertinent subjects are discussed in detail. Twenty-eight illustrations, charts, and tables are included for quick reference. To show how sizes and velocities are figured, a typical problem is set up and then solved and discussed in a question and answer method.

COLOR DYNAMICS: Dept. NIB, Public Relations Dept., Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh 22—How scientific use of the energy in color is employed in plants and factories to increase overall efficiency is shown graphically in a 32-page booklet. Sections are devoted to the use of color on machinery and equipment; on walls and ceilings; and on floors, aisles and mobile equipment with emphasis on color for safety.

TEMPERATURE CONTROL: Wheelco Instruments Co., 847 West Harrison St., Chicago 7—Educational bulletin No. 5 on "Automatic Temperature Control System" contains charts, tables and diagrams explaining measurement and automatic control and the selection of proper control systems for process applications. ASME terminology referring to processes and automatic control is also listed.

LUBRICATION: Trabon Engineering Corp., 1814 East 40th St., Cleveland 3—Bulletin 469 describes company's line of oil and grease pumps for manual, automatic, motor-driven and mechanically driven operation. These pumps lubricate machinery while it is running and reduce lubricant consumption and lubricating man-hours.

LABORATORY SUPPLIES: Eberbach & Son Co., Ann Arbor, Mich.—Company house magazine published periodically describes laboratory apparatus and supplies and endeavors to keep research, control and development laboratories up to date on new items.

GOGGLES: Eastern Equipment Co., Willow Grove, Pa.—Catalog section AWP-50 describes the eight basic spectacle-type goggle designs offered to cover grinding, chipping, welding or similar hazards. Price list is attached.

Alnor PYRO LANCE
built for foundry service

The rugged, shock resisting pyrometer movement and the enclosed extension thermocouple make a unit especially designed for foundry service. It is easy to secure the quick, accurate temperature readings which are so important in the efficient production of sound castings.

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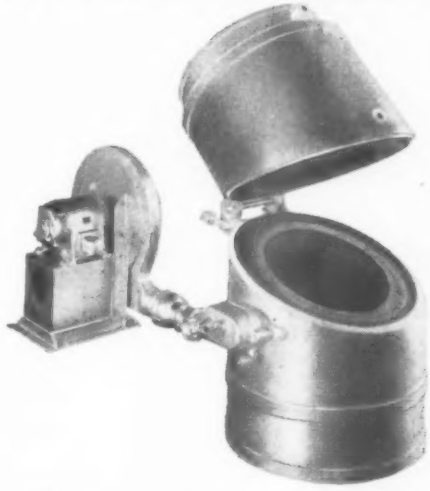

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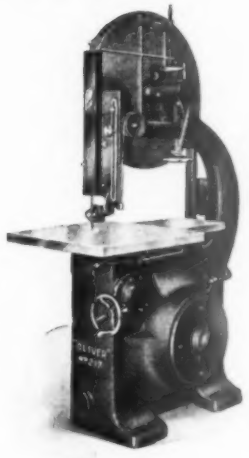

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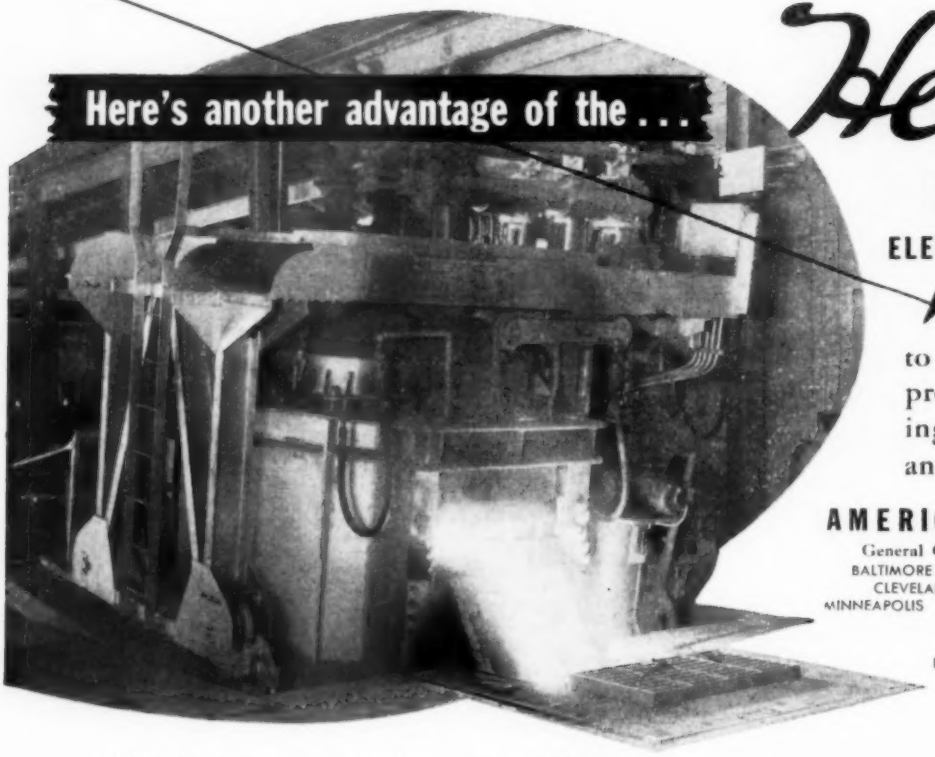

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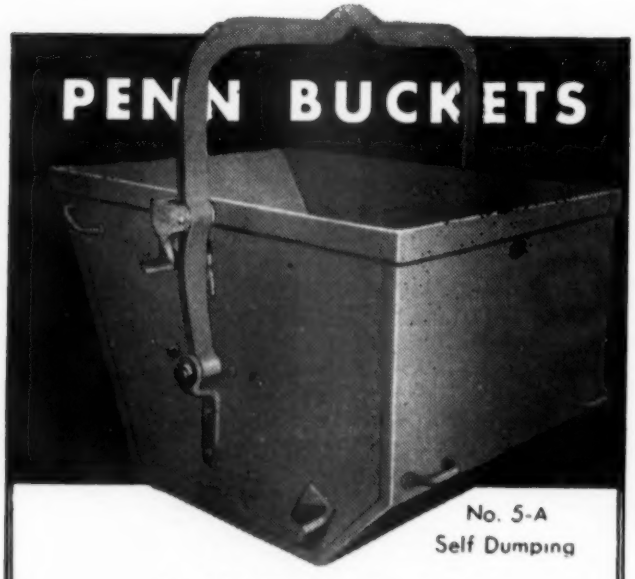

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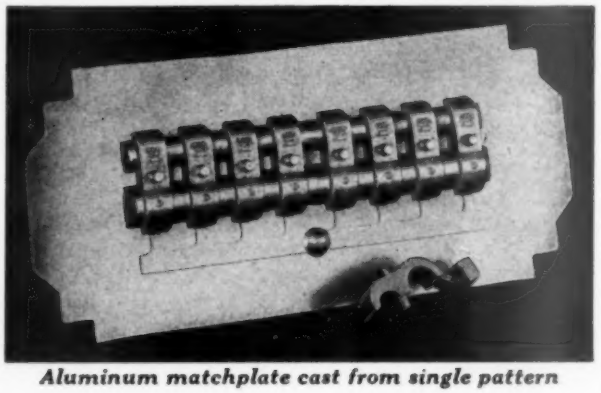

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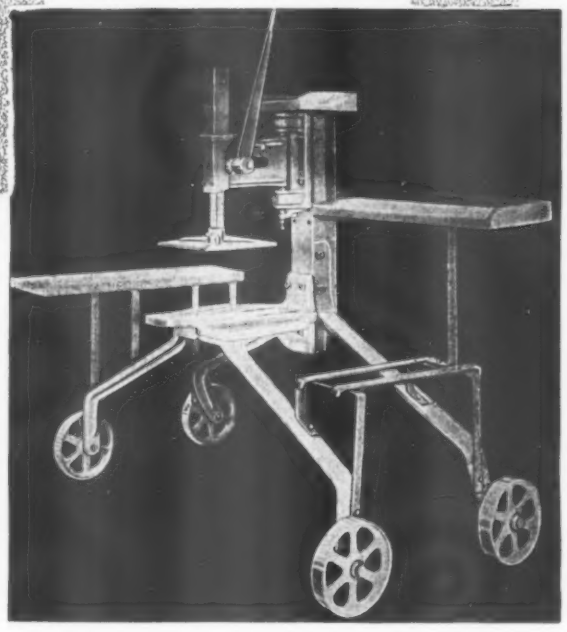

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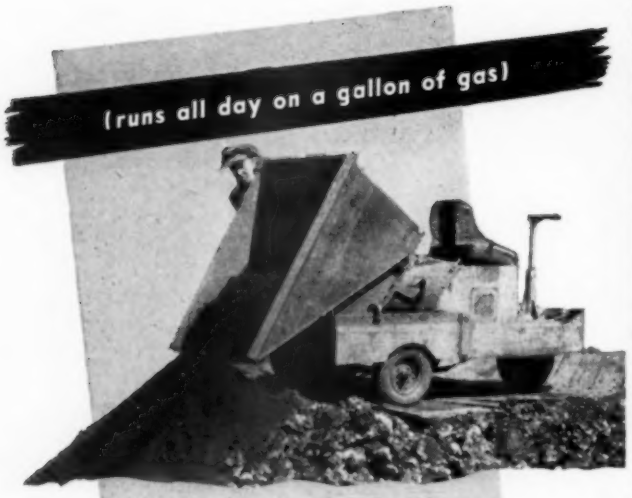

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The heap is aerated and fluffed as the sand is thrown to the rear by the rotary wire brush, releasing steam and gases.

Write for list of users and further information.

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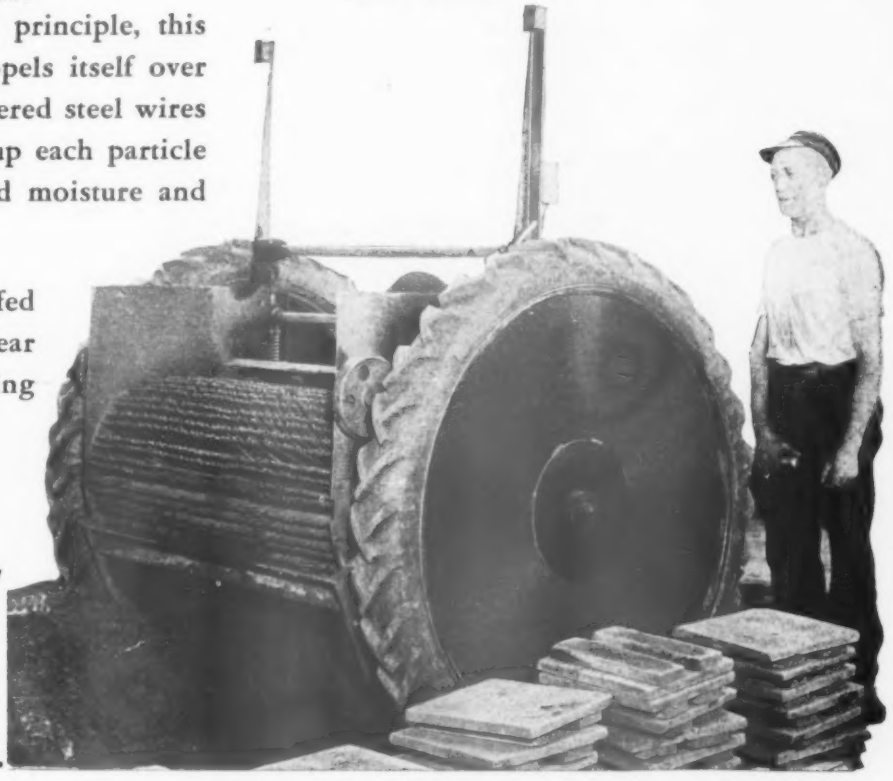

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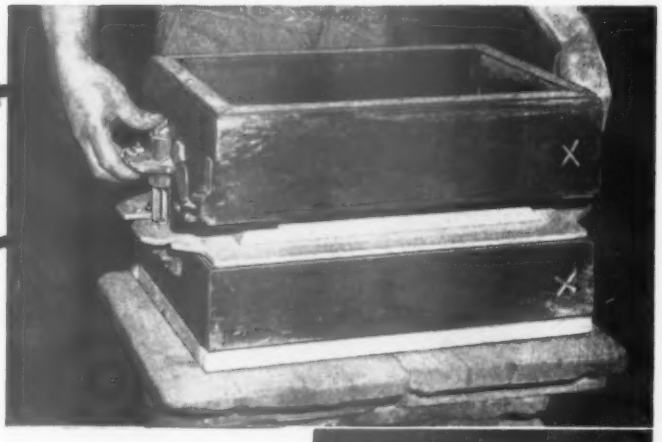

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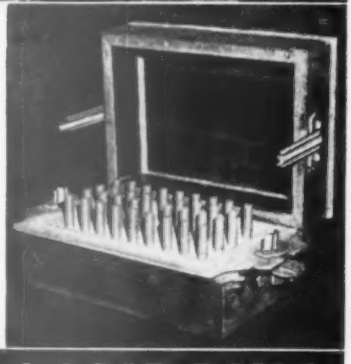

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LESTERGRAM

TO FOUNDRYMEN WHO ARE
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2. Quote many jobs on both a sand and die cast basis . . .
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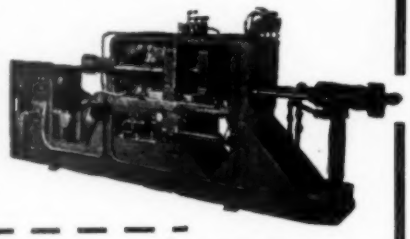
*An Unknown number.



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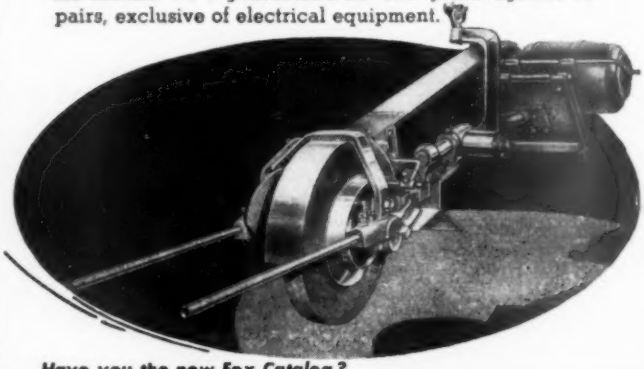

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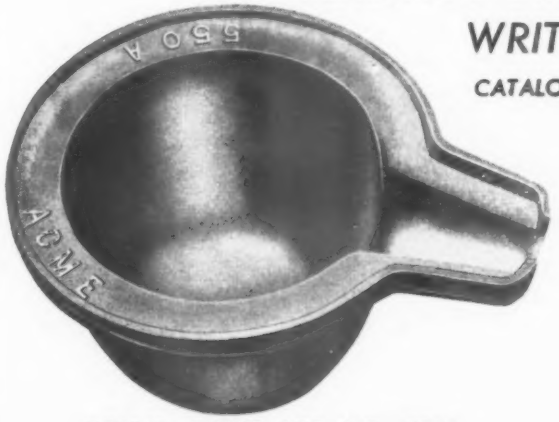

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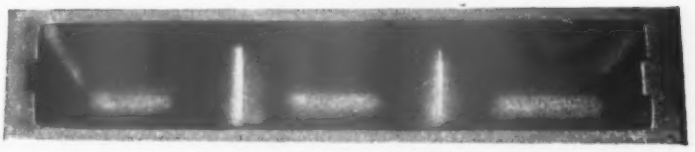

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Industrial GRINDERS . . .

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Mall Flexible Shaft Grinders operate at constant speed with true concentric motion and minimum of gyroscopic force in the working tool. Ball bearing mounted straight and angle spindles combine with flexible shaft to make power available in any position at any angle. Light-weight working tools for Grinding, Sanding, Wire Brushing, Drilling and other jobs are quickly interchanged.

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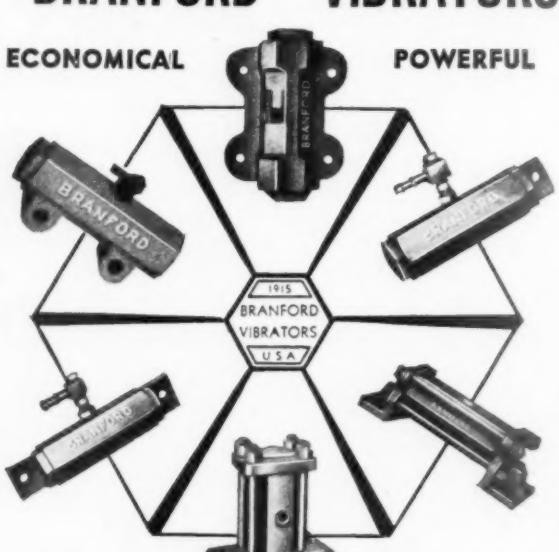

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fractures at a much slower rate and into much larger pieces than regular shot. This automatically results in less dust and lower refuse costs. These long wearing qualities, plus its fracture resistant structure, lower your consumption of CLEANBLAST ALLOY 99 SHOT by a considerable percentage. We are always happy to discuss cleaning problems in this connection, sample and laboratory services are available on request.

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NEFF & FRY BINS are monuments to alertness and progressiveness in the adoption of storage methods. These bins provide all the advantages of silo-type storage with the added factor of economy in erection and maintenance costs.

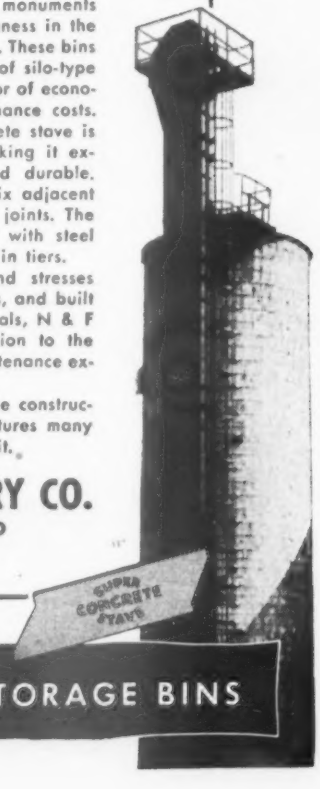
The N & F super-concrete stave is formed under pressure, making it extremely smooth, dense, and durable. Each stave interlocks with six adjacent staves to form strong, tight joints. The structure is securely bound with steel hoops, encircling the staves in tiers.

Engineered to withstand stresses far beyond the requirements, and built of corrosion-resisting materials, N & F Bins last from one generation to the next with practically no maintenance expense incurred.

Our catalog explains the construction of N & F Bins and pictures many typical installations. Ask for it.

THE NEFF & FRY CO.

CAMDEN, OHIO



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Solving belt problems—like yours—for nearly 4 decades has provided us with the RIGHT ANSWERS TO YOUR PROBLEMS!!

Engineering advice and recommendations will be cheerfully furnished with no obligation whatsoever . . . and no personal follow-ups unless requested.

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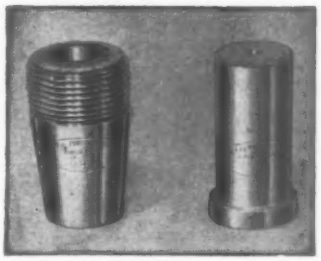
WHEREVER BLASTING IS DONE!



Wherever there is blast cleaning there ought to be a Federal Blast Nozzle. Made of cast tungsten-carbide (the hardest metal known to man) the Federal Blast Nozzle concentrates the blast, reduces air costs and outwears any nozzle previously offered for the purpose.

Being cast, the tungsten-carbide is pure—as is not the case when made by sintering.

The purity of the metal ensures long wear, reduces air consumption and guarantees concentration of the blast—all due to the extremely slow wear of the orifice.

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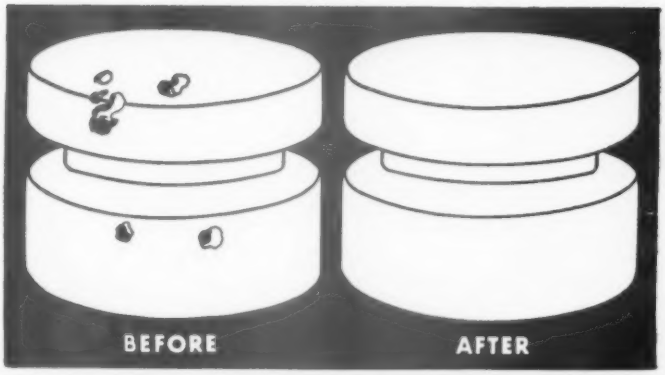
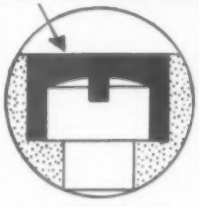


SURFACE-DEEP DEFECTS Don't Rate a Rejection!



Countersunk bolt protected

When one of your iron or steel castings shows internal defects, there's nothing to do but scrap it. When it has mere surface defects—sand holes, blow holes, pock marks, dents, etc., unpleasing to look at but harmless, yet might look too bad to your customer—don't scrap it.

Do what hundreds of expert foundrymen have been doing the past 50 years. True up those surfaces with Smooth-On No. 4 Foundry Cement. You can match the casting's color and texture. The repair will harden like the metal itself and hold. You can even file or machine it.

So always keep Smooth-On handy for "beautifying" marred castings. Use it, too, to cover countersunk bolt heads. Ask for it at your supplier house. If they haven't it, write us.

CHOOSE YOUR MATCHING SHADE

For light gray, close-grained, high lustre castings use Smooth-On No. 4AA. 1-, 10- and 50 lb. sizes. For medium gray, medium lustre castings use Smooth-On No. 4A. 1-, 5-, 25- and 100-lb. sizes. For dark gray, coarser-grained castings use Smooth-On No. 4B. 1-, 5-, 25- and 100-lb. sizes.

FREE SAMPLES: Fill out the coupon, paste to a post-card and mail. You'll receive without cost or obligation, a generous working sample of the Smooth-On shade you select, specimens of hardened Smooth-On and the 40-page Smooth-On Repair Handbook of useful metal repairs.

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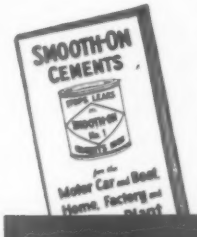

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Do it with **SMOOTH-ON**

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METALS FEEDING COMPOUND

(Patents Pending.)

For Ferrous and Non-Ferrous Metals

THERMOTOMIC is a revolutionary exothermic feeding compound which is used to secure better feeding of castings. It produces a temperature of about 3200° F., and generates 35,000 B.T.U.'s per pound of material. This permits reduced size of feeding heads or risers, substantially lowered cleaning costs, and a greater reduction in scrap return. THERMOTOMIC is produced in powder form. It is mixed with water only and molded into feeding ring cores or inserts of any desired shape, and baked dry in exactly the same manner as ordinary sand cores. No special equipment is required for its use. THERMOTOMIC raises the temperature of the metal where it is applied as inserts or as feeding rings under the heads, permitting better feeding of the metal into the mold and retarding solidification in those portions of the casting where rapid cooling may cause piping, shrinkage, or segregation. THERMOTOMIC can also be used as facing inserts where it is desired to maintain fluidity of cast metal in the mold. THERMOTOMIC is used regularly by hundreds of nationally known foundries as standard practice in the production of ferrous and non-ferrous castings.

SOFFEL'S NO. 5 CARBON FREE LIQUIDIZER

For Use in Feeding Heads and Risers

SOFFEL'S NO. 5 CARBON FREE LIQUIDIZER has an intense exothermic action which makes it indispensable for feeding heads and risers. When applied on the molten metal of the feeding heads and stirred in, it generates a temperature of 3000° F., keeping the feeding metal liquid and free to feed the casting 50% longer. Pipe and shrink cavities under heads and risers are eliminated. After burning out, the LIQUIDIZER forms a soft insulating cover which confines the heat and further delays solidification of the feeding metal. No. 5 LIQUIDIZER may also be used as a cover on the metal in pouring ladles. It may be applied either in the bottom of the ladle or on top of the metal when the ladle is full. The LIQUIDIZER will raise the temperature of the metal, increase its fluidity, and prevent the formation of surface dross. It is an excellent thermal insulator, and will prevent loss of heat through radiation. When stirred into the metal, it acts as a deoxidizer.

NOTE:—Neither the THERMOTOMIC COMPOUND nor NO. 5 CARBON FREE LIQUIDIZER will alter the chemical analysis of any metal in any way.

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HELPFUL LITERATURE

NOTE TO READERS: If you will check the item or items described which particularly interest you, we will be glad to request the manufacturers concerned to send you their literature. Use the attached postal card

1. Storage Batteries

Electric Storage Battery Co.—Three illustrated bulletins cover selection and use of lead-acid storage batteries and battery charging equipment for industrial trucks.

2. Woodworking Machine

Equipment Engineering Co.—4-page illustrated bulletin form No. 50M 12-46 describes Nall Radial Woodworker for beveling, bevel ripping, rabbeting, dadoing, rafter notching, angle dadoing, radius cutting, fluting, shaping, tongue and grooving and tennoning.

3. Moisture Meter

J. Thomas Rhamstine—2-page illustrated bulletin form No. 22-10-46 describes Rhamstine moisture meter for determining moisture in foundry sand. Simple to operate, unit gives instantaneous and constant reading and provides for accuracy within 0.25-per cent in moisture control.

4. Welding and Cutting

Air Reduction Sales Co.—64-page illustrated general catalog covers both electric and gas welding and cutting equipment. One section deals with oxyacetylene welding and cutting gases, equipment and supplies. Other section describes arc welding machines, accessories and electrodes.

5. Laboratory Equipment

Central Scientific Co.—20-page illustrated publication *Cenco News Chats*, No. 53, presents diversified information on line of laboratory equipment. In addition, methods of accomplishing a number of laboratory procedures are discussed.

6. Grinders, Buffers & Lathes

Standard Electrical Tool Co. — 36-page illustrated catalog No. 43, third edition, presents specifications and application data on line of blowers; portable and radial drills; angle plate, bench, carbide tool, die, disk, internal and knife grinders; and speed lathes.

7. Foundry Equipment

Sterling Wheelbarrow Co. — 56-page illustrated catalog No. 57 presents information on complete line of custom built floor, bench, and machine molding flasks. They can be supplied in variety of styles and shapes. In addition, catalog describes wheelbarrows, carts and buggies.

8. Chill Nails

Standard Horse Nail Corp.—5-page loose-leaf type catalog presents information on Koolhead foundry chill nails and spider chills for use in foundries. Specifications and price list of these hot forged, cold finished products are given.

9. Electric Furnace

American Bridge Co. — 24-page illustrated catalog "The Heroult Electric Furnace" presents information on operating efficiency, design, operation safety, control sensitivity, charging rate, rapidity of melt, metallurgical performance and operating costs of Heroult three-phase electric arc furnaces.

10. Iron Cement

Smooth-On Mfg. Co.—40-page illustrated handbook covers complete line of Smooth-On iron cement products. Smooth-On No 4 for foundry use is available in three shades and is in powder form for mixing with water. It is used for filling blow holes, sand holes, surface blemishes and rough and porous places in iron or steel castings to produce even surface.

11. Dust Collectors

Peters-Dalton, Inc. — 16-page illustrated bulletin No. 101 lists styles, applications, advantages, sizes and performance data on line of Hydro-Whirl wet dust control systems. Installation photos and operation diagrams are included.

12. Business Activity Chart

A. A. Wickland & Co. — Folding wall chart graphically illustrates national income, federal debt, business activity, stock averages, cost of living and commodity costs from 1775 to 1947. Presidential administrations and wars are indicated.

13. Hoists

Robbins & Myers, Inc. — 6 and 8-page illustrated folders No. 800 and No. W-815 cover type F½ low headroom hoist and general line of hoists for wide range of industrial applications, respectively. Type F½ hoist is electrically powered, has safety factor of five and is equipped with roller, ball and bronze bearings. Two available models have 1000 and 2000-pound capacities.

14. Core Blowing Machine

Wm. Demmler & Bros. — 4-page illustrated folder "No. 1 Demmler" describes high production core blowing machine designed for small work such as plumbing goods and electrical fittings up to 1½ inches in size. Working capacity is about 200 core boxes per hour.

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15. Ferrous Welding Rods

Welding Equipment & Supply Co. — 6-page illustrated folder "Eureka No. 2" presents typical applications of No. 2 H. S. S. welding rods for use in refluting side mills, restoring reamers, reclaiming turning tools, repairing broach inserts and constructing tools. Physical properties and heat treatment are covered.

16. Refractory

Cleveland Quarries Co. — 22-page illustrated bulletin No. 15-B reveals application information on Buckeye Silica Firestone refractory for use in soaking pits, Bessemer converters, blast furnace ladles, mixers and gray iron cupolas. Chemical properties, absorption and thermal expansion are some of characteristics covered.

17. Vibration Equipment

Martin Engineering Co. — Illustrated data sheet "The Peterson Vibrolator" describes all-directional vibrator which is simple in operation. Unit is operated by compressed air and is available in five sizes to meet wide range of foundry requirements.

18. Air Operated Vise

Van Products Co. — 8-page illustrated catalog "Case Studies" shows Vi-Speed holding fixtures in actual operation. Units will provide pressures of up to 7000 pounds, will crimp, bend, drive, form and rivet. They can be mounted in multiple at any required distance. Operation is on 95-pound air line pressure.

19. Metals & Alloys

Niagara Falls Smelting & Refining Div. Continental-United Industries Co. — 80-page book "Facts For Foundrymen," sixth edition, by Ernest G. Jarvis and Herbert O. Jarvis reveals information on commonly used alloys and their applications. Material is intended to be of assistance in the production of improved castings.

20. Sand Conditioning Machine

Purity Moulding Sand Co. — 4-page illustrated folder "The Moulders' Friend" describes self-propelled unit that can condition sand at rate of 1 ton per minute. Machine is mounted on pneumatic tires. Wire brush picks up sand particles and machine adds bond and moisture for thorough blend.

21. Gypsum Cement

United States Gypsum, Industrial Sales Div. — 4-page illustrated bulletin No. IGL-15 describes high expansion Hydrocal which is gypsum cement having characteristics of uniform expansion and gradual setting action. Material is recommended for use in metalworking industry.

22. Crucible Melting Furnace

Stroman Furnace & Engineering Co.— 4-page illustrated bulletin No. 90 presents information on stationary crucible melting furnaces for brass, bronze, aluminum and other alloys. Capacities range from No. 20 to No. 400 crucibles. Maintenance costs, application features and construction data are included.

23. Metal Cleaning

Pangborn Corp.—26-page illustrated bulletin No. 213 presents advantages of airless Rotoblast barrel metal cleaning process for work which is tumble blast cleaned. Diagrams and data charts are supplied to describe equipment fully.

24. Core Blower

Randall Corp. — 4-page illustrated folder "Cut Core Room Costs" deals with core blowers equipped with swing type head for the blowing of multiple boxes without refilling. Blow head capacity is 13 pounds. Rear column serves as air reservoir and water trap.

25. Power Belt Conveyors

Rapids-Standard Co. — 32-page illustrated catalog No. 31-C5 contains descriptions and specifications of entire line of Rapid Power Booster, power belt conveyors. Units are shown in actual operation. Portable Challenger and Defender models and Stevedore Jr. models are featured.

26. Grinding Machine

Vonnegut Moulder Corp. — 4-page illustrated folder "Marschke Grinder" presents description and details of operation of swing frame portable grinding machines for in-between operations. Wheel is 12 by 2 inches in size, horsepower rating is 3 and unit operates at 1800 revolutions per minute.

27. Foundry Equipment

Allis-Chalmers Mfg. Co. — 20-page illustrated booklet "Foundry Mechanization" is intended to serve as insight into equipment for use in wide range of foundry operations from light to heavy jobbing. Foundromatic shakeouts, sand conditioning machinery, and furnace controls are described.

28. Dust Collectors

American Blower Corp. — 72-page illustrated bulletin No. 1128 reveals performance data, design specifications and laboratory reports on type D centrifugal collectors, fly ash precipitators, multiple unit receptacles, etc. for wide range of industrial applications.

29. Die Casting Machine

Light Metal Machinery, Inc. — 6-page illustrated folder "Die Casting with the Work Horse" fully describes automatic high speed low cost Work Horse die casting machine for use with zinc, lead and tin. Operating speeds are listed as 240, 330, 520 and 720 shots per hour. Shot capacity is 16 ounces.

30. Goggles and Accessories

Mine Safety Appliances Co.—8-page illustrated bulletin No. CE-29 describes complete line of eye protection equipment for all industrial requirements. Types for grinders, welders, melters and workmen requiring corrective glasses are included.

31. Vibration Feeding Machine

Syntron Co. — 4-page illustrated folder "Automatic Batch Weighing with Vibratory Feeders" describes machines having rotating circular weighing hopper for handling any bulk material. Pushbutton control and fast feed are features.

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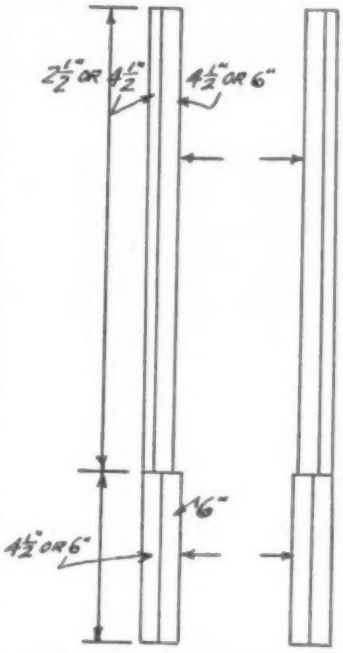

Vertical section showing inner lining without disturbing outer lining. Mark in dimension and we will supply sketch and kind and quantity brick and clay required. Standard and SUPER cupola blocks and series.

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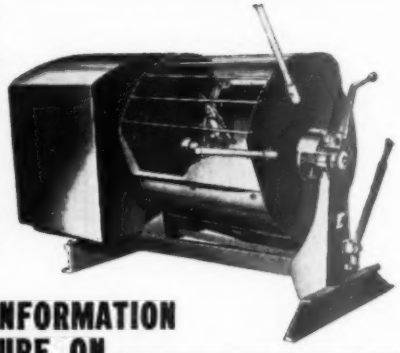

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The "Post Convention" Issue of

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This big special issue will contain special feature articles which will become the permanent record of the convention to be held in Detroit April 28-29-30 and May 1st.

Advertising forms for the June issue will close May 6th, 1947.

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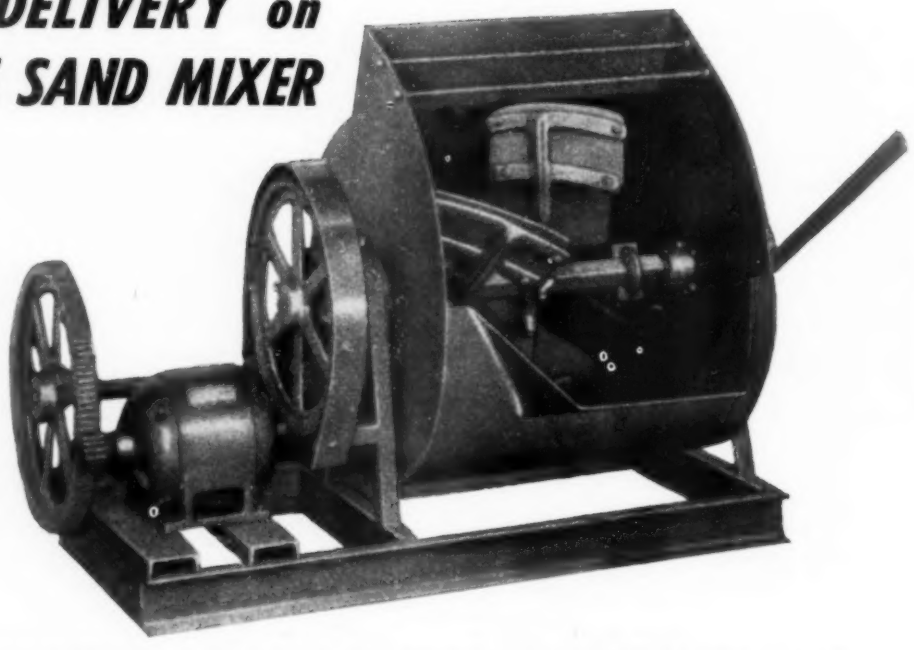

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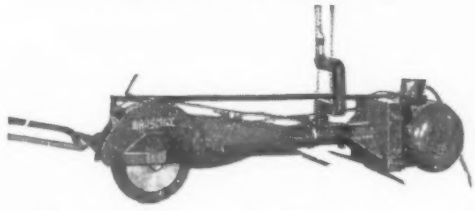

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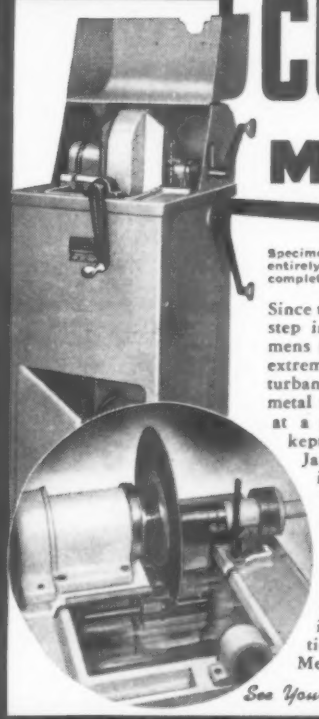

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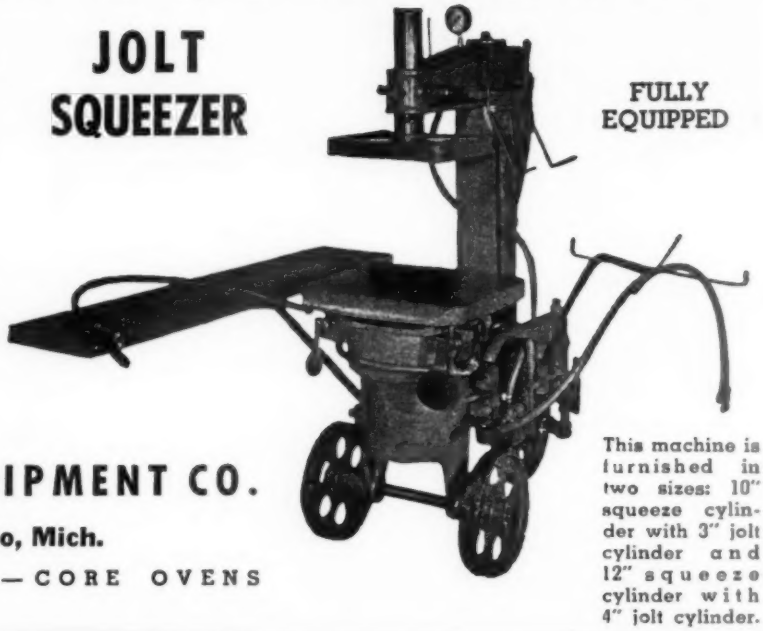

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Casting weight, 5 pounds each 25 molds per day—125 pounds 125 pounds metal @ .20 lb	25.00
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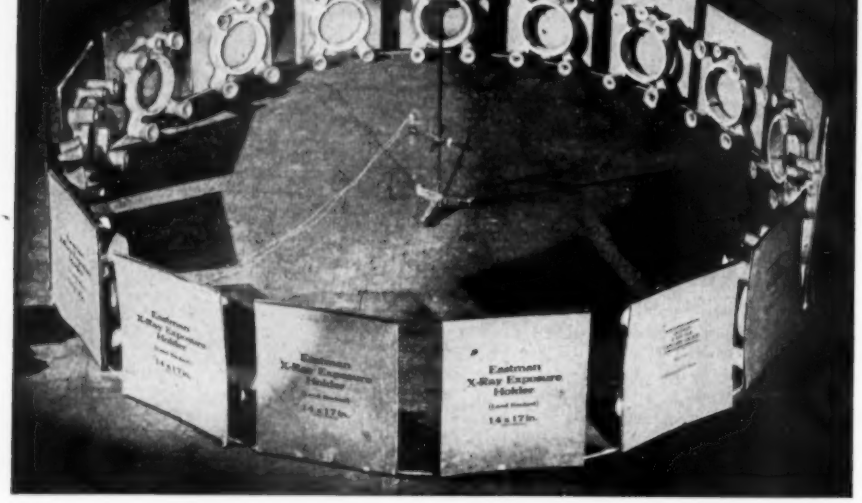

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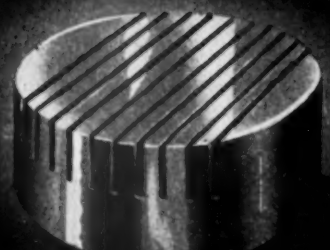

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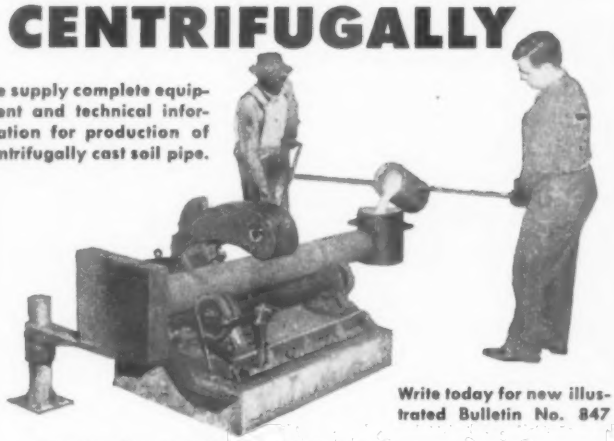

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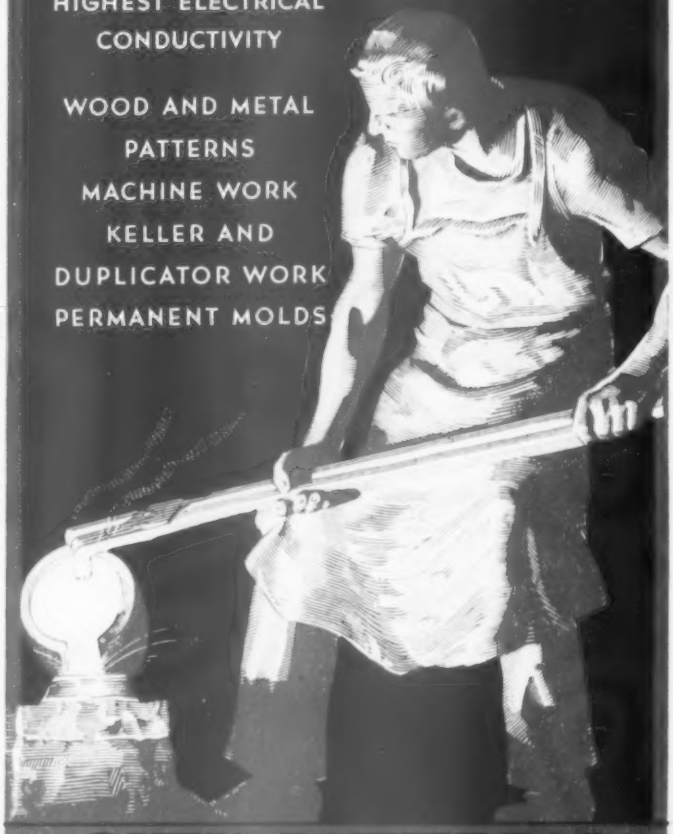

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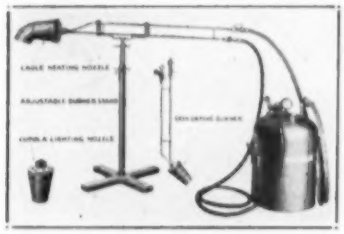

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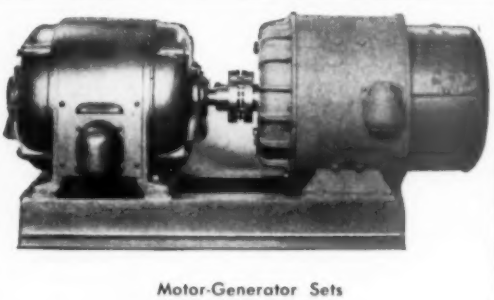

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Campbell-Hausfeld Co., Harrison, Ohio.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
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Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Electric Furnace Co., W. Wilson St., Salem, Ohio.
56 Church St., New York 7, N. Y.
Johnston Mfg. Co., Minneapolis 13, Minn.
R-S Products Corp., 4530 Germantown Ave., Philadelphia 44, Pa.
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Ajax Metal Co., Philadelphia 23, Pa.
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Johnston Mfg. Co., Minneapolis 13, Minn.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago 6, Ill.

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Ajax Electrothermic Corp., Trenton, N. J.
Ajax Engineering Corp., Trenton, N. J.
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American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Greene Electric Furnace Co., 2702 6th St., Seattle 4, Wash.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

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Bellevue Industrial Furnace Co., 2975 Bellevue Ave., Detroit 7, Mich.
Campbell-Hausfeld Co., Harrison, O.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
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Fen Machine Co., 1350 Babbitt Rd., Cleveland 17, Ohio.

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Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Haynes Foundry Equipment Co., 814 Ada St., Kalamazoo 21, Mich.
Johnston Mfg. Co., Minneapolis 13, Minn.
R-S Products Corp., 4530 Germantown Ave., Philadelphia 44, Pa.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago 6, Ill.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.

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Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

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Electric Furnace Co., W. Wilson St., Salem, Ohio.
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Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
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Campbell-Hausfeld Co., 300-320 Moore St., Harrison, O.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
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FURNACES (Nonferrous Melting) (cont'd)

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Buehler Ltd., 228 N. LaSalle St., Chicago 1, Ill.
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Associated Engineers Inc., 230 E. Berry St., Fort Wayne 2, Ind.
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Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
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International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
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Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Haynes Foundry Equipment Co., 814 Ada St., Kalamazoo 21, Mich.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
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SILICA FLOUR

Ottawa Silica Co., Ottawa, Ill.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.

SILICON (Briquets)

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

SILICON CARBIDE (Briquets)

Carborundum Co., Perth Amboy, N. J.

SILVERY PIG IRON see Pig Iron (Silvery)

SKIMMER BARS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

SKIMMERS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

SKIP HOISTS

Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

SLIP FLASKS

Adams Co., Dubuque, Iowa.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

SLINGS (Chain)

Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
S. G. Taylor Chain Co., Hammond, Ind.

SLIP JACKETS

Adams Co., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

SMELTERS & REFINERS

American Smelting & Refining Co., 120 Broadway, New York 5.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.

SNAGGING WHEELS—See ABRASIVE WHEELS

SNAP FLASKS

Adams Co., Dubuque, Iowa.
Diamond Clamp & Flask Co., Richmond, Ind.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

SODA ASH

Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17, N. Y.

SOLDER

American Smelting & Refining Co., 120 Broadway, New York 5.

SPACE HEATERS

Dravo Corporation, Neville Island, Pittsburgh 25, Pa.

SPECIAL FOUNDRY ALLOYS

Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

SPATS (Safety)

Safety Clothing & Equipment Co., 7016 Euclid Ave., Cleveland 13, Ohio.

SPIEGELEISEN

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

SPRAY GUNS

Murphy & Co., Jas. A., Hamilton, O.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.

SPRUE CUTTERS

Adams Co., Dubuque, Iowa.
Freeman Supply Co., Toledo 5, O.
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee, Wis.

STEEL (High Speed)

Bethlehem Steel Co., Bethlehem, Pa.

STEEL (Structural)

American Bridge Co., Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa.

STRIPPING MACHINES

Adams Co., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.

SURFACE TREATMENT METALS

N. Ransohoff, Inc., 208 W. 71st St., Cincinnati 16, O.

TAPER PINS

Standard Horse Nail Corp., New Brighton, Pa.

TEMPERATURE CONTROLLERS

Illinois Testing Laboratories, 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane Columbus 1, O.

TESTING EQUIPMENT

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.

TESTING LABORATORIES

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.

TESTING MACHINES (Tensile)

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.

THERMOCOUPLES

Illinois Testing Laboratories, 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

TIERING MACHINES (Power)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TIMERS (Electric)

Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

TIN

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

TONGS

Industrial Equipment Co., Minster, O.

TOOLS (Pneumatic Portable)

Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17, N. Y.
Dayton Pneumatic Tool Co., Dayton 1, O.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Schramm Inc., West Chester, Pa.

TORCHES and BURNERS (Acetylene, gas, oil)

Freeman Supply Co., Toledo 5, O.
North American Mfg. Co., 4455 E. 71st St., Cleveland 4, O.

TRACTORS (Gas Powered)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TRAMRAIL SYSTEMS

American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Modern Equipment Co., Port Washington, Wis.

TROLLEYS

Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.
Modern Equipment Co., Port Washington, Wis.

TRUCK BATTERIES (Industrial)

Electric Storage Battery Co., Allegheny Ave. at 19th St., Philadelphia 3, Pa.

TRUCK CRANES

Hughes-Keenan Co., Mansfield, Ohio

TRUCKS (Dump)

Phillips Mine & Mill Supply Co., 2227 Jane St., Pittsburgh 3, Pa.

TRUCKS (Industrial)

Buda Company, Harvey, Ill.

TRUCKS (Power Lift)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TRUCK WHEELS

Bethlehem Steel Co., Bethlehem, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

TUBES (Annealing)

Pressed Steel Co., Wilkes-Barre, Pa.

TUMBLING BARRELS

Cleveland Chaplet & Mfg. Co., 1197 West 67th St., Cleveland 2, O.
Haynes Foundry Equipment Co., 814 Ada St., Kalamazoo 21, Mich.
N. Ransohoff Inc., 208 W. 71st St., Cincinnati 16, O.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

TURNTABLES

Beardsley & Piper Co., The 2424 No. Cicero, Chicago 39, Ill.
Modern Equipment Co., Port Washington, Wis.
Roto-Cast Foundry Equipment Inc., 100 Grand St., Coldwater, Mich.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

UNIT HEATERS

Dravo Corp., Neville Island, Pittsburgh 25, Pa.

UNLOADERS (Portable-Gas, Electric)

Bosworth Engineering Co., 6723 Denison Ave., Cleveland, Ohio.

VACUUM CLEANERS (Industrial)

Breuer Electric Mfg. Co., 5100 N. Ravenswood Ave., Chicago 40, Ill.

VACUUM CLEANERS (Portable, stationary)

U. S. Hoffman Machinery Corp., 105 4th Ave., New York 17, N. Y.

VALVES (Air, Water, Steam)

Air-Way Pump & Equipment Co., 405 S. Jefferson St., Chicago 7, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
North American Mfg. Co., 4455 E. 71st St., Cleveland 4, O.
R-S Products Corp., 4530 Germantown Ave., Philadelphia 44, Pa.

VALVES (Adjustable Orifice)

North American Mfg. Co., 4455 E. 71st St., Cleveland 4, Ohio.

VALVES (Blow-off and Cut-off)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Wm. H. Nichols Co., Richmond Hill, Long Island 18, N. Y.

VENTILATING SYSTEMS

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Joy Mfg. Co., La-Del Division, New Philadelphia, Ohio.
Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Swartwout Co., 18511 Euclid Ave., Cleveland 15, Ohio.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.

VENTILATORS (Roof)

Swartwout Co., 18511 Euclid Ave., Cleveland 15, Ohio.

VENTS (Core Box)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Demmler & Bros., Wm., Kewanee, Ill.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.

VIBRATORS

Adams Co., Dubuque, Iowa.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Cannon Vibrator Co., 111 Power Ave., Cleveland 14, Ohio.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Davenport Machine & Foundry Co., Davenport, Iowa.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Martin Engineering Co., Kewanee, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Nichols Co., Wm. H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Syntron Company, Homer City, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

VIBRATORS (Core Bench)

Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.

VISES (Air Operated)

Van Products Co., Erie, Pa.

WARM AIR HEATERS

Dravo Corp., Neville Island, Pittsburgh 25, Pa.

WASH ROOM EQUIPMENT

Bradley Washfountain Co., Box 732, Milwaukee 1, Wis. Milwaukee, Wis.

WAX (Core, Vent, Pattern)

PMS Co., 1701 Power Ave., Cleveland 14, O.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

WEDGES (Foundry)

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WELDING GAS

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.

WELDING APPARATUS (Electric Arc)

Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Metallizing Company of America, 1330 W. Congress St., Chicago 7, Ill.

WELDING and CUTTING APPARATUS and SUPPLIES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.

WELDING ELECTRODES (Carbon)

National Carbon Co., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

WELDING RODS & ELECTRODES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Metallizing Company of America, 1330 W. Congress St., Chicago 7, Ill.

WHEELBARROWS

Construction Machinery Corp., Waterloo, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS, ABRASIVE (Cut-off)

Bay State Abrasive Products Co., Westboro, Mass.
Bridgeport Safety Emery Wheel Co. Inc., Bridgeport, Conn.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
General Grinding Wheel Corp., West Abrasives, Inc., Philadelphia 34, Pa.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Keystone Abrasive Wheel Co., Carnegie, Pa.
Raybestos Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Mid West Abrasive Co., Detroit, Mich.
Norton Company, Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, Ohio.

WHEELS (Wire)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE BRUSHES

Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE NAILS

Bethlehem Steel Co., Bethlehem, Pa.
Republic Steel Corp., Cleveland 4, O.

WOODWORKING MACHINERY

Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Oliver Machinery Co., Grand Rapids 2, Mich.

X-RAY EQUIPMENT

Allis Chalmers Mfg. Co., Milwaukee 1, Wis.

X-RAY FILMS

Eastman Kodak Co., Rochester, N. Y.

ZINC

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

Classified Advertising

Help Wanted

ENGINEERING REPRESENTATIVE

Excellent opportunity to represent one of America's largest and best-known manufacturers of Industrial Ovens, Furnaces and mechanized Finishing Systems. A dependable, nationally-advertised line of oven equipment you'll be proud to sell; fastest deliveries in the industry. Profitable Michigan territory immediately available on exclusive basis to right man. Must live in Detroit and should have following in the automobile industry. Experience in industrial ovens or finishing processes very desirable. Graduate engineer preferred but not essential. Will consider established manufacturer's agent now selling allied, but non-competitive equipment. Give complete references, experience and technical background in first letter. Address: BOX 310, THE FOUNDRY, CLEVELAND 13, OHIO.

AGENTS WANTED FOR NEW LINE OF CORE BLOWERS

For Buffalo, Pittsburgh, Cleveland, Birmingham, New York City and New England. Address: WESTERN HARDWARE & SPECIALTY MFG. CO., 3830 N. FRATNEY ST., MILWAUKEE 12, WIS.

COREROOM SUPERVISOR

To operate coreroom of 200 employees. Must have ability to organize and to manage efficiently production and inspection of all cores used in the manufacture of gray iron castings for automotive, farm equipment, machinery and other miscellaneous work. Need tactful supervisor, familiar with core blowing machines, bench and other types of work. Write in detail experience, education, references and age. Address: Box 301, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Middle Western gray iron foundry requires foreman, middle age preferred. Must be capable in handling men, directing operations of cupola, squeezer machines, core making and some floor molding. Must also know how to mix iron by analysis. Address detailed reply stating age, education, experience, references and salary desired to: Box 265, The FOUNDRY, Cleveland 13, Ohio.

MOLDER

Thoroughly familiar with gray iron jobbing work, able to operate cupola, make cores, read blue prints and rig jobs. Required to mold at first, later take charge of 6 to 8 molders as foreman. Highest wages, steady work. Detroit District. Address: Box 233, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

For old established gray iron jobbing foundry pouring ten tons light and medium weight castings daily. Location Ohio. Principal production from jolt squeeze and rollover machines. Thorough knowledge of cupola and molding required. State age, experience in detail, firms worked for and when available. Good starting salary and future. Address: Box 226, The FOUNDRY, Cleveland 13, Ohio.

ASSISTANT FOREMAN

In a modern equipped mechanized brass foundry. Good opportunity. Must have thorough knowledge of foundry and oil furnace practice. State age, experience and salary expected. Address: Box 274, The FOUNDRY, Cleveland 13, Ohio.

PATTERN MAKER FOREMAN

By foundry manufacturing small brass castings of plumbers' fixture fittings and trim. Must have experience in wood and metal pattern making layout and general supervision. Good chance for advancement with a growing concern. Write stating experience, approximate wages expected and other particulars. Address: Box 173, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Experienced and reliable for all types of bronze castings. Small well established Ohio firm. Address: Box 212, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Experienced bronze-tablet molders wanted in Cincinnati, Ohio. Address: Box 225, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

FOUNDRY SUPERINTENDENT

PRACTICAL FOUNDRY MAN WITH MOLDING EXPERIENCE FOR JOBBING FOUNDRY. MUST HAVE KNOWLEDGE OF CUPOLA OPERATION; ALSO CORE ROOM; MAKING CASTINGS FOR MACHINE TOOLS, PUMPS, PRINTING EQUIPMENT, ETC. NEW, MODERN FOUNDRY HAS JUST BEEN COMPLETED AND THIS IS AN EXCELLENT OPPORTUNITY FOR THE RIGHT MAN. LOCATION IN OHIO VALLEY.

BOX 307

THE FOUNDRY CLEVELAND 13, OHIO

CORE SETTER

In steel foundry located in Eastern Pennsylvania producing acid electric castings up to 3000 lbs. In reply state age, experience and salary desired.

BOX 270

THE FOUNDRY CLEVELAND 13, OHIO

SALES REPRESENTATION

Brass and bronze ingot producer has territories open in Michigan, Indiana and Ohio for man with good connections among nonferrous foundries. Commission basis. Address: Box 207, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

By electric steel foundry in the Mid-west, making small carbon and low alloy steel castings. Please give qualifications and salary expected. Personal interview will be arranged with qualified applicant, at our expense. All correspondence will be held in strictest confidence. Address: Box 222, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY REPRESENTATIVE

For a medium sized nonferrous sand casting foundry. In business for over 15 years. Producing aluminum and magnesium castings. Production or experimental work. Heat treating and x-ray equipment. Desire representation in Southern States on commission basis. Address: Box 297, The FOUNDRY, Cleveland 13, Ohio.

PLANT ENGINEER

Master mechanic for a large Midsouth plant having mechanized foundries. To take charge of all services such as millwright, tool room, electrical, etc. Prefer man with M.E. Degree who is qualified for maintenance as well as plant engineering work. In reply, state complete qualifications. Address: Box 261, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

WELDING TECHNICIAN AND SUPERVISOR

Applicant with a metallurgical background who has had practical welding experience in a steel casting foundry will be given consideration.

BOX 263

THE FOUNDRY CLEVELAND 13, OHIO

FOUNDRY FOREMAN

Northern New York State. Gray iron foundry producing 25-30 tons daily. Castings vary in weight from several ounces to ten tons. Average 100 pounds. Molders, laborers and coremakers total 130 men. Must have reputation for satisfactory handling of men. Give full experience, references and salary in first letter.

BOX 272

THE FOUNDRY CLEVELAND 13, OHIO

COREMAKER

Gray iron foundry making small sand medium sized castings requires core room foreman preferably with valve castings experience. Give full experience, references and salary in first letter.

BOX 271

THE FOUNDRY CLEVELAND 13, OHIO

SALES ENGINEER

To sell special and standard metal parts washing machines, also new type foundry cleaning mills. Engineering background preferred but not essential. Territory available Western New York state and sections of Canada. State age, education and experience in first letter.

BOX 262

THE FOUNDRY CLEVELAND 13, OHIO

FOUNDRY SUPERINTENDENT

Capable of supervising and operating bronze and iron foundries. Must have considerable experience in small castings, matchplates, hand patterns and core work. Hardware experience preferred but not necessary. Address: Box 284, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

For a nonferrous foundry manufacturing small castings. Excellent living conditions, good wages and chance for advancement. Growing concern. Address: Box 945, The FOUNDRY, Cleveland 13, Ohio.

WORKING FOREMAN

With supervisory experience to operate gray iron squeezer foundry on percentage basis with or without financial interest. State qualifications. Address: Box 220, The FOUNDRY, Cleveland 13, Ohio.

SALESMAN

Salesman wanted for solicitation of pattern work. Must have acquaintance in territory starting with Northeastern Ohio. Must be able to produce results. Address: Box 298, The FOUNDRY, Cleveland 13, Ohio.

MAINTENANCE ENGINEER

Experienced in the design, installation and maintenance of foundry equipment, including sand and casting conveyors. Large Southern plant. Excellent opportunity for experienced man. Address: Box 260, The FOUNDRY, Cleveland 13, Ohio.

SALES REPRESENTATIVE

Manufacturer of foundry supplies and equipment requires the services of sales representative in Western Pennsylvania and New York. Address: Box 311, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Help Wanted

FOUNDRY FOREMAN

Experienced in floor molding and production for molding machines in Southwest iron foundry. Must be aggressive. Good future for man with ambition and hard work. State age, work history and references first letter. Applications held confidential. Address: Box 313, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

ASSISTANT SUPERINTENDENT NONFERROUS METALLURGIST

B. S. in metallurgical engineering. Three years' experience in foundry research involving foundry alloys, melting, gating, casting and testing. Desire position in development or production capacity. Address: Box 904, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Practical molder and core maker on all classes of work. Understand cupola operation thoroughly and read blue prints. Have technical training. At present employed. Married. Address: Box 198, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Desires position as foreman on light production or jobbing, soil pipe and fittings. Gray iron or nonferrous. Twenty-one years' experience. Molder, coremaker and foreman. Have complete charge of gray iron foundry at present. Prefer Central or Western New York. Address: Box 202, The FOUNDRY, Cleveland 13, Ohio.

STANDARDS & METHODS

Are you looking for a capable and industrious leader for your Standards & Methods Dept.? Twenty years' experience in malleable, gray iron and steel foundries. If you want better methods, increased production and reduction in cost, then let your problems be handled by a well qualified foundry engineer. Address: Box 283, The FOUNDRY, Cleveland 13, Ohio.

MANUFACTURING EXECUTIVE

Desires position where his broad experience can help meet competitive conditions ahead. Graduate engineer with experience in operating foundries, machine shops and fabricating shops. Address: Box 305, The FOUNDRY, Cleveland 13, Ohio.

LIGHT ALLOY ASSISTANT SUPERINTENDENT CHIEF FOUNDRY METALLURGIST

B.S. in Met. Eng. Six years' experience in above positions in aluminum and magnesium foundries. Can handle rigging, gating, all phases control, costing, light alloy design, etc. Good knowledge permolding. Accustomed to responsibility. Seek affiliation in which technical knowledge and background are essential. Address: Box 285, The FOUNDRY, Cleveland 13, Ohio.

BRASS FOUNDRY SUPERINTENDENT

Practical trained foundryman covering 35 years on all types of castings is seeking a change. Married. Can furnish best of references as to character and ability. Address: Box 299, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Practical gray iron foundry man with technical training. Wide background of experience and knowledge in all departments of jobbing or production foundries, mechanized equipment and all modern methods. Well versed in metallurgy. Good labor relations. Wants to make connection with company in need of foundryman of my experience. Address: Box 241, The FOUNDRY, Cleveland 13, Ohio.

AVAILABLE

One experienced and practical foundry and industrial engineer. Experienced in gray iron, malleable, steel and brass and aluminum. Short terms. Reasonable rates. Address: Box 813, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRY SUPERINTENDENT

Thirty-seven years of age—eighteen years of practical foundry experience. Presently employed as superintendent of gray iron jobbing and production foundry. Housing must be available. Address: Box 236, The FOUNDRY, Cleveland 13, Ohio.

MANAGER OR SUPERINTENDENT ALUMINUM AND MAGNESIUM FOUNDRY

Many years' experience with magnesium and aluminum quality castings. Know all modern methods of melting and producing in both alloys. Good organizer. Capable of quality production and successful operation of all departments. Decidedly cost conscious. Best references. Address: Box 250, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL-TECHNICAL GRAY IRON FOUNDRYMAN

Age 47 with broad background of 26 years' experience in the foundry from sand pile to superintendent in general jobbing and high production. Well versed in modern and scientific laboratory controls, synthetic and natural sands, continuous melting, metal control and alloying core blower, power changing, etc. Making change. Address: Box 290, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY INDUSTRIAL ENGINEER

College man with six years in gray iron, malleable, aluminum and magnesium foundries. Actual and supervisory experience in all departments. Experience in production control and foundry management. Know time study, methods, job evaluation, wage incentives and costs. Address Box 281, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Practical foundryman with broad background of experience producing quality castings from few ounces to 8 ton in machine tool, steam pumps, diesel motors and pressure castings. Experience covers green and dry sand, pit work mixing and alloy iron gating and risering for high test iron, rigging for molding machines and working from blueprints. Want to make change. Address: Box 291, The FOUNDRY, Cleveland 13, Ohio.

PATTERN FOREMAN

Previously connected with steel, but at present with brass, aluminum and grey iron foundry Working knowledge of foundry practice. Can estimate for jobbing or production. Wood or metal. Twenty years' experience as foreman. Desire change. References from past employers. Address: Box 228, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

If you are looking for a high grade metallurgist with 20 years' experience in the grey iron, cast steel and malleable iron foundry business, one who understands mass production and quality control and can produce the goods, then I am your man. Am interested in locating on the Pacific Coast or in the Middle West. Address: Box 172, The FOUNDRY, Cleveland 13, Ohio.

PATTERNSHOP SUPERINTENDENT

With wide knowledge of patternwork for gray and malleable iron and nonferrous metals desires new connection. Good manager and know how to handle men. Will go anywhere. Address: Box 235, The FOUNDRY, Cleveland 13, Ohio.

METALLURGICAL ENGINEER

Age 34. Eight years' experience in iron and steel foundry process development work. Presently employed as development engineer. Desires position as service engineer with progressive iron or steel foundry. Midwestern location preferred. Address: Box 162, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Practical experience in the production of heavy to light machinery castings, dry, green sand and loam. Production work on jolt squeeze, rollover, continuous pouring. Technically trained, specializing in sand control and cupola operation. Can produce high tensile iron for pressure castings. Excellent results with labor relations. Married, available at once. Address: Box 252, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

PRESSURE CAST MATCHPLATE MAKER

Able to set up and operate a matchplate shop. Thoroughly experienced in the production of matchplates, cope and drag equipment, core boxes, driers and pattern castings. Interested in offers from foreign countries. Address: Box 286, The FOUNDRY, Cleveland 13, Ohio.

CHIEF METALLURGIST

For research, control or contact work. Has organized and supervised large metallurgical departments. Twenty-five years' continuous foundry experience. Capable of heading up a bureau or service. Master's degree. Now employed. Address: Box 254, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Supervisor 26 years' gray iron semi steel bronze, McLain graduate. Melt by analysis jobbing or production. Know how to handle men. Prefer foundry south Mason Dixon line. Address: Box 296, The FOUNDRY, Cleveland 13, Ohio.

MOLDER

Available with 28 years of practical and technical foundry experience in grey iron, semi steel and nonferrous metals desires a position as foundry foreman. Experienced on small and big castings, green or dry sand, jobbing or production work. Know mixing of iron and cupola operation. Chicago area preferred. Address: Box 295, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY SUPERINTENDENT

Thoroughly qualified gray iron practical foundryman. Twenty-five years' broad experience in all phases of foundry practice, producing highest quality castings of light to heavy weight in both general jobbing and high production. Very good record in handling labor. Address: Box 276, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY DESIGNER

Desires connection with foundry contemplating expansion, modernization or mechanization program. Over ten years' experience with leading foundry consulting engineers. Wide and practical experience in aluminum, brass, gray iron, malleable and steel foundry design. Good working knowledge modern equipment, conveying and sand handling systems and modern industrial building design. Address: Box 289, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

Practical foundryman with technical training. Thirty years' experience, including fifteen years of supervision. Well versed in all phases of jobbing and production work in both gray iron and nonferrous metals. Progressive and up to date in modern methods of production. Capable of taking complete charge of medium sized foundry. Available on short notice. Address: Box 300, The FOUNDRY, Cleveland 13, Ohio.

PRODUCTION MANAGER

Successful practical planner, 25 years' experience including sales, machine shop and foundry. Address: Box 111, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

With eleven years' experience as superintendent of two steel foundries of good reputation. Light and medium work. Various types of production and miscellaneous bench and floor work. Good knowledge of all departments including mechanical and electrical maintenance. Address: Box 306, The FOUNDRY, Cleveland 13, Ohio.

SUPERVISOR

Specialist in synthetic molding sand with ten years of general foundry experience in jobbing foundries and a large farm implement foundry with positions of foreman and general foreman. Now employed as a synthetic molding sand control foreman. Can be available in two weeks. Will go anyplace. Address: Box 268, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT OR METALLURGIST

Graduate metallurgist, ten years' experience producing high quality gray iron. Extensive background in sand control and cupola operation. Desire position as foundry superintendent or metallurgist. Address: Box 266, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Positions Wanted

PATTERNMAKER

General experience wood and metal patterns, capable estimate costs and produce patterns for experimental or production work. Teach apprentices and handle journeymen to produce day's work. First class mechanic on layout and accurate work on bench if small shop. Matchplates, plaster cast or sand molds also core blowing equipment and driers for production. Address: Box 293, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Thirty-two years' foundry experience. Twenty-five years as Foundry Superintendent. Capable of taking complete charge of all foundry operations, both ferrous and nonferrous. Good connection more important than a large salary. Address: Box 257, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY MANAGER OR SUPERINTENDENT

McLain graduate, 25 years' experience in all phases of production or jobbing, also pattern engineering. Wishes to connect with medium sized foundry. Eastern states preferred. Address: Box 264, The FOUNDRY, Cleveland 13, Ohio.

STEEL CASTING SALESMAN

Wide experience, capable of managing sales of medium size foundry, or district sales office. Some cast iron experience. Available soon. Address: Box 259, The FOUNDRY, Cleveland 13, Ohio.

YOUNG GRAY IRON METALLURGIST

Available in June. Two years' experience in chemical analysis, physical testing, sand control, cupola operation and control and metallographic analysis. Special studies but no experience in heat treatment. B.S. degree. Prefer Eastern location. Address: Box 258, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGER

Can deliver top performance and full coverage in all departments. Abstract and references available. 21 years' big league experience in ferrous field. Address: Box 253, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Practical high grade gray iron foundryman age 46, technically trained with broad experience from molder to superintendent producing quality work in general jobbing and high production in both conventional and highly mechanized foundries. Well versed in cupola and sand control, core, rigging and gating. Estimate costs from blue prints. Excellent record in handling of labor. Address: Box 275, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER

With approved record in successfully managing and building up foundry, machine and allied industries available shortly for position requiring dependable qualifications and service. Ability to efficiently direct all office, sales, financial and creative activities and produce consistent profits unquestionably established by previous record. Address: Box 304, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT
GRAY IRON, NONFERROUS METALS

Practical foundryman with many years experience in gray iron, semi-steel and nonferrous metals. Light, medium and heavy castings such as copper, aluminum, red brass, yellow brass, manganese bronze and aluminum bronze. Experienced in jobbing semi-production and mechanized foundry set up. Understand patternshop, molding, coreroom, grinding, cleaning and shipping room. Age 40, married. Employed as foundry superintendent. Desire change. Address: Box 312, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

STEEL AND GRAY IRON FOUNDRY MANAGER OR SUPERINTENDENT

Graduate chemical and metallurgical engineer, age 33, with several years' practical foundry experience and operational management, will be available May first. Capable of assuming complete charge of operations with an ability for mass production of high quality castings at reduced cost. Address: Box 303, The FOUNDRY, Cleveland 13, Ohio.

PERSONNEL DIRECTOR OR MANAGER

Twenty-five years' experience in all phases of personnel work including dealing with unions from grievances through contract making. Nine years' experience in iron-steel foundry. Available at once. Address: Box 282, The FOUNDRY, Cleveland 13, Ohio.

Correspondence Course

GOOD FOUNDRYMEN ARE NOT AN ACCIDENT—THEY DO NOT MERELY HAPPEN

Foundrymen who will add the concisely arranged information on mixing, melting, and semi-steel to their store of experience will prove a valuable asset to any firm. Even though you know 90% of what we offer, the remaining 10% may be causing your firm large losses. Our report on your melting may be worth the fee alone. Remember, semi-steel is the purest, hottest and strongest metal made in the cupola. Synopsis free.

MCLAIN'S SYSTEM INC.
236 E. NORTH AVE.
MILWAUKEE 12, WIS.

Accounts Wanted

STEEL CASTINGS

Iron and Bronze lines and Equipment wanted by Chicago District Manufacturers' Representatives with 20 years' contacts in Steel Mills and Industrials. Diligent attention given accounts, excellent references furnished and unusual selling ability proven.

BOX 288
THE FOUNDRY CLEVELAND 13, OHIO

EFFICIENT REPRESENTATION

Metallurgical engineer, fifteen years' sales experience, excellent executive contacts industrial trade throughout Michigan; seeks production and maintenance items such as forgings, stampings, die castings and ferrous and nonferrous alloy castings, any process.

BOX 279
THE FOUNDRY CLEVELAND 13, OHIO

Open Capacity

OPEN CAPACITY

Aluminum and brass foundry located in Western Illinois has open capacity for squeezer and bench work. Precision castings a specialty. Address Box 245, The FOUNDRY, Cleveland 13, Ohio.

OPEN CAPACITY

We have open capacity for squeezer, jobbing and floor work in aluminum sand castings. Address: ARCANUM ALUMINUM FOUNDRY, P.O. BOX 128, ARCANUM, OHIO.

OPEN CAPACITY

FOR GREY IRON—SEMI-STEEL

Castings under 200 pounds in machine production or small quantities.

contact
WINFIELD R. MACKEEBY
INDUSTRIAL SALES ENGINEER
BLOOMSBURG, PA.

Open Capacity

OPEN CAPACITY

New permanent mold developed for making four inch soil pipe fittings. Nothing too difficult to design from frying pans to engines, including sinks and tubs.

WAGNER PERMANENT MOLD CO.
2910 EMPIRE AVE. BURBANK, CALIF.

Wanted-To-Buy

WANTED

Tabor 40" power rollover and draw molding machine.
20 tons assorted steel flasks (large).
New core plates.
All sizes air compressors.
We are in market for 84" cupola.

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 E. BROAD ST., SHILLINGTON
READING, PA.

WANTED

Osborn jolt rollover pattern draw molding machine #601 or 602. Give available date and price.

DODGE STEEL COMPANY
6501 TACONY ST.
PHILADELPHIA 35, PA.

WANTED

Surplus stocks steel shot and grit.

BOX 280
THE FOUNDRY CLEVELAND 13, OHIO

WANTED

Cupola furnace with 63" or 66" shell. Must be in A-1 condition. Also blower and refractories.

PORTLAND STOVE FOUNDRY CO.
PORTLAND, MAINE

WANTED

One—403 Osborn jolt rollover machine or one 403-W Osborn jolt rollover machine. Address: Box 174, The FOUNDRY, Cleveland 13, Ohio.

EXPERT MOLDER

Superior in all phases of foundry work. Desires own foundry or partnership in going concern with unlimited capacity. Write: Box 292, The FOUNDRY, Cleveland 13, Ohio.

WANTED TO BUY

9' or 11' tractor type sandslinger. Advise serial number and price. Address: Box 302, The FOUNDRY, Cleveland 13, Ohio.

TO LEASE

With option to purchase small gray iron foundry located in Illinois, Iowa, Minnesota or Wisconsin. Give full particulars. Address: Box 273, The FOUNDRY, Cleveland 13, Ohio.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Type AA sand cutter, gas driven, cutting blades 52" wide, outside width of wheels 74". Address: Box 232, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Foundries for Sale

PRODUCTION FOUNDRY FOR SALE

15,000 sq. ft—5 acres—steel and cement block bldg. 8 jolt squeezers—4 jolt rollovers—2 strippers—Pangborn rotoblast—12 ft. table, 42 in. Whiting cupola (capacity 15 to 20 tons per day)—2 core ovens—large assortment of snap flasks. On main highway 30 miles North of Detroit. A going business. Will sell control or 100%.

MR. D. VINCENT
WARDELL SHERATON HOTEL
DETROIT, MICHIGAN

FOUNDRY FOR SALE

Small gray iron foundry located in Iowa. Full mechanized and now running six tons a day. Located on excellent rail facilities. Buildings in fine shape. Completely equipped with molding machines, blast cleaning machine, sand conditioning equipment, flasks, etc. Complete core room. Crane over bay. Act quick. Address: Box 278, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOR SALE

Aluminum permanent mold foundry, producing building specialties; national distribution. $200,000 a year business. Owner must sell at once, no reasonable offer will be refused. Address: FLORIDA DIE CASTING FOUNDRY, P.O. BOX 1589, ORLANDO, FLA., PHONE 2-1838.

WEST COAST STEEL FOUNDRY FOR SALE

Going steel foundry well situated, with good market. Production capacity 200 tons per month of carbon and low alloy steels. Foundry now operating with good equipment and full personnel. Address: Box 277, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Nonferrous foundry located in Central New York State. Illness forces owner to sell. Excellent opportunity. Foundry is fully equipped and may be purchased on reasonable terms. Address: Box 218, The FOUNDRY, Cleveland 13, Ohio.

Opportunities

OPPORTUNITY

We can furnish empty tight and slack wooden barrels also steel drums for your products. ADDRESS: BUCKEYE COOPERAGE STATION, C.P.O. BOX 1501, CLEVELAND, OHIO.

Employment Service

SALARIED POSITIONS
$2,500-$25,000

This thoroughly organized confidential service of 37 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
101 Dun Bldg. Buffalo 2, N. Y.

SALARIED PERSONNEL

$3,000—$25,000. This reliable service, established 1927, conducts confidential negotiations for high-grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, DEPT. T, 109 CHURCH STREET, NEW HAVEN, CONN.

For Sale

FOR SALE

Roto-Cast revolving mold conveyor. 12′ diameter, 5 months old.

1—16″ metal lathe.

WELLMAN BRONZE & ALUMINUM CO.
6017 SUPERIOR AVE.
CLEVELAND, OHIO

FOR SALE

One 84″ cupola complete with motor, blowers and controls. Contact BILLARD MACHINE & TOOL CO., MANSFIELD, PA.

For Sale

FOR SALE

12—International, Type R. J.—14″ x 8″
6—International, Type R. J.—20″ x 8″
1—Tabor Hand Rollover—20″ x 8″
10—International, Type E.M.C., Special—20 x 62 x 5″
8—International, Type E.M.C., Special—14 x 30 x 5″

Core Grinders
2—Milwaukee Type #70—Price $1,750.00 ea.

1—Royer, N.D.P. Sand Separator — 2 H.P. 3/60/220 Motor
1—New Belt for N.D.P. Machine

1—Paxson Cupola, 90″ dia., 50′ high
Registered as an Approved Dealer by War Assets Administration. Send us your inquiries.
SCULLY MACHINERY & EQUIPMENT CO., Not Inc.
77 WEST WASHINGTON ST.
CHICAGO 2, ILL.—PHONE: STATE 5346

TURBO BLOWERS

(4) 675 cfm @ 6 oz., Spencer, driven by 2 HP, 220/440 V., 3 ph. 60 cycle 3600 RPM

PRESSURE BLOWERS

1200 cfm @ 11 oz. Buffalo with 7½ HP, 220 volt, 3 ph. 60 cy. 1750 RPM
1100 cfm @ 16 oz. Sturtevant 8 x 8, 24″ dia. wheel
800 cfm @ 24 oz. Amer. Blower with 10 HP, 220/440 volt, 3 ph. 60 cy. 3600 RPM
500 cfm @ 14½ oz. McKee 6 x 6 with 5 HP 3600 RPM

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND 14, OHIO

FOR SALE

FOUNDRY EQUIPMENT:

1—Screen, revolving, 4′d x 9′L with speed reducer and motor.
1—Screen, vibrating, Tyler Model 27 3′ x 5′.
4—Furnaces, melting, Hausfeld Mag-Tilt 1200 lb. capacity.

METAL TESTING EQUIPMENT:

1—Charpy Impact Testing Machine, made by Steel City Testing Machine Co.
1—60,000# T. Olsen Universal (four screw) Testing Machine with motor drive.

BOHN ALUMINUM & BRASS CORPORATION
1400 LAFAYETTE BUILDING
DETROIT 26, MICHIGAN

FOR SALE

2—#250 (750#) Walker-York tilting brass melting furnaces practically new.

1—Used Pangborn EN 2 hand sand blast cleaning cabinet.

THE GIBSON & KIRK COMPANY
WARNER AND BAYARD STREETS
BALTIMORE 30, MARYLAND
PHONE—LEXINGTON 1200

FOR SALE

Iron or Steel Melting Furnace One Ton Capacity Brackelsberg Rotary Type, Oil Fired, carrying new guarantee of Whiting Corporation. Installed but never used. Complete with all motors, blowers, burners, 55″ diameter x 35′ high Steel Stack for Air Preheater. Will sacrifice.

W. F. CURLEE MANUFACTURING CO.
P.O. BOX 776
HOUSTON 1, TEXAS

For Sale

FOR SALE

Kuhlman Detroit Electric Rocking Furnace, LFC, 350 lb. Capacity, 2200 Volt Primary, 60 Cycle, Single Phase; Complete with One latest type shell and extra lining; One brass shell and extra lining; Over one hundred Electrodes; several barrels of linings, cement, and supplies; 1-KWH meter and 1-KW meter; Electrode cooling pump and motor; Transformer, bus bars and brackets; Circuit breaker, high tension fuse blocks, transformer, conduit, etc.; Will sell at bargain, $2,000.00. No longer needed. May be inspected:

MEADOWS MFG. CO.
1190 ASTOR AVE. S.W., ATLANTA, GEORGIA
P.O. BOX 4354

FOR SALE

One 1000 KVA electric furnace transformer for three phases 60 cycles 7200 volt power. Water-cooled and tap changing. Can be used as a power step down.

BOX 213
THE FOUNDRY CLEVELAND 13, OHIO

FOR SALE

1 #8 victor colliau hot blast cupola
76″ diameter outside
16′ high
66″ diameter, ¼ steel stack
2 tap holes at 180°
Charging door 43″ x 6′3″
Set on iron platform—4 iron legs 50″ high. Spout and blast gauge.

BOX 287
THE FOUNDRY CLEVELAND 13, OHIO

FOR SALE

1—405 Osborn jolt roll-over pattern draw; jolt cylinder 12″ dia. Pattern draw 18″ max. flask limit 64″.

BOX 309
The FOUNDRY CLEVELAND 13, OHIO

FOR SALE

1—Madison-Kipp die casting machine $3,200.00, F.O.B. Jacksonville, Fla.

THE C. I. CAPPS COMPANY, INC.
P.O. BOX 3335, JACKSONVILLE 6, FLA.

FOR SALE

1—1200# type AA Detroit rocking electric furnace complete with new automatic controls. Inquire: **ALTON BOWEN, BOX 1125, SYRACUSE, N. Y.**

FOR SALE

6000-1 Lecco carbon determinator bought new 1946—used only two weeks.

CHICAGO HARDWARE FOUNDRY CO.
NORTH CHICAGO, ILLINOIS

FOR SALE

Whiting hydro-clone spark suppressor for #4 Whiting cupola. Has been kept painted and never been used. Will sacrifice for $1250.00, cost new $2500.00.

NUTMEG CRUCIBLE STEEL CO.
BRANFORD, CONN.

Classified Advertising

For Sale

1-TON
Detroit 38' Span
2-TON
Conco 27'6⅜" Span
Industrial 25' Span
3-TON
P&H 37'6" Span
P&H 48' Span
P&H 42'1½" Span
Shaw 33' Span
5-TON
Robbins & Meyers 20' Span
Northern 48'1½" Span
Shaw 40' Span
Northern 57'2" Span
Shepard 37'3" Span
P&H 37'3" Span
Provincial 47'3" Span
Northern 30' Span
Whiting 25'6" Span
Detroit 38'8" Span
10-TON
Shepard Niles 57' Span
Alliance 100' Span
Shepard 27'7½"
Alliance 58'9" Span
Niles 17'9" Span
Morgan 55'6" Span
Ederer 74'4" Span
Shepard 40' Span
P&H 87'6" Span
Lane 60' Span
Niles 75'1½" Span
Shaw 80'9" Span
Whiting 37' Span
Toledo 77' Span
Shaw 67'6" Span
Whiting 48' Span
12½-TON
Niles 75'1" Span
15-TON
P&H 32' Span
Ederer 74'4" Span
Lane 50' Span
Alliance 27'4" Span
P&H 97' Span
Whiting 47'1½" Span
Morgan 73'5½" Span
Morgan 82' Span
Bedford 34'6" Span
20-TON
Ederer 74'4" Span
25-TON
Overhead Crane 100' Span
New Albany 50' Span
Bedford 27'3" Span
Bedford 67'8" Span
Bedford 46'2½" Span
Alliance 38'2" Span
Ederer 66' Span
Shaw 58' Span
Tysaman 60' Span
Ederer 55' Span
Ederer 40' Span
30-TON
Ederer 74'4" Span
Whiting 74'4" Span
Euclid 32'1" Span
Ederer 60' Span
Ederer 76' Span
Northern 75' Span
35-TON
Ederer 74'4" Span
Shepard Niles 49' Span
40-TON
Overhead Crane 150' Span
50-TON
P&H 40' Span
Alliance 52' Span
150-TON
Whiting 30' Span
200-TON
Alliance 100' Span

TELEPHONE US COLLECT TO DISCUSS YOUR REQUIREMENTS.

ECONOMY COMPANY, INC.
49 VANDERBILT AVENUE, NEW YORK 17, N. Y.
TELEPHONE: MURRAY HILL 4-1616

FOR SALE

1—Ransohoff Water Mill 36 x 60 side loading and end loading. Automatic star separation and star return. Complete with direct drive and in good condition.

1—Battery of four 24" x 54" tumbling barrels.
2—30" x 52" tumbling barrel only.
1—30" x 38" tumbling barrel only.
4—18" x 52" tumbling barrel only.

BOX 308
The FOUNDRY CLEVELAND 13, OHIO

FOR SALE

27" x 36" American Wheelabrator—$2900.00
Tabor molding machines—$150.00
Nicholls molding machine—$75.00

BILLARD MACHINE & TOOL CO.
MANSFIELD, PA.

FOR SALE

2—42" x 72" x 1¼" Sly round tumbling barrels.
1—48" x 72" Whiting round tumbling barrel.
3—#154-A Rockwell furnaces.

THE OHIO MALLEABLE IRON CO.
COLUMBUS, OHIO

FOR SALE

Day core oven, like new, 4 drawers. A.B.C. automatic oil burner, with G.E. motor, built in overload protector and G.E. ignition transformer. Rystrom fuel pump, Minneapolis-Honeywell regulators, White-Rodgers industrial thermostat oven controls. Address: HILLSDALE FOUNDRY CO. INC., HILLSDALE, MICHIGAN.

FURNACE FOR SALE

Monarch simplex #94 rotating aluminum and brass melting furnace, 2000 lb. brass capacity; good condition and is on skids ready for shipping $950. Address: FLORIDA DIE CASTING FOUNDRY, P.O. BOX 1589, ORLANDO, FLA., PHONE 2-1838.

FOR SALE

Gray iron foundry. 2 brick and steel buildings. 1—40' x 80'; 1—30' x 60', one block from railroad siding. 40 miles from Pittsburgh, Pa. Address: Box 234, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

New heavy duty motorized rod cutter, 65 cuts per minute; capacity: ¾ inch round hot rolled steel. Brand new. $890.00 f.o.b. Cleveland. Address: Box 772, The FOUNDRY, Cleveland 13, Ohio.

COMPLETE EQUIPMENT OF IRON & BRASS FOUNDRY

Located in southern city. Price $4500—less than value of one piece of equipment. Carload of coke also included if sold immediately. Address: Box 294, The FOUNDRY, Cleveland 13, Ohio.

CLASSIFIED ADVERTISING RATES

POSITION WANTED

Minimum advertisement set solid, 30 words $1.50. Additional words 5c each.

HELP WANTED

Minimum advertisement set solid 30 words or less $3.00. Additional words 10c each.

FOR SALE

Minimum advertisement set solid, 30 words or less $3.00. Additional words 10c each.

WANTED

Minimum advertisement set solid, 30 words or less $3.00. Additional words 10c each.

Miscellaneous advertisements such as "Personals", "Services" etc., minimum 30 words set solid $3.00. Additional words 10c each.

NOTE: If replies are to be sent to a box number in care of The Foundry, add 6 words to your advertisement for box number and address.
Any advertisement set in all caps, add 50% to above rates.

For Sale

FOR SALE

ALL EQUIPMENT REBUILT & GUARANTEED IN STOCK

OVERHEAD ELECTRIC TRAVELING CRANES

	TONS	MAKE	SPAN	CURRENT
(2)	1½	Shepard	18'0"	230-VDC.
(1)	20	Cleveland	50'0"	230-VDC.
(1)	25/5	Niles	80'0"	230-VDC.

ELECTRIC MONORAIL HOISTS

(1)—½-ton American LoHed 230-VDC.

(6)—½-ton Shepards, 230-VDC, 5-HP. motor HIGH SPEED, FL. OP., 30'0" lift.

(1)—1-ton Shepard 230-VDC., FL. OP.

SPECIAL: 7½-ton, 2-motor, cage operated, Shepard 230-VDC., 40'0" lift, enclosed for out door service, hoist 28/70-FPM., Trolley 400-FPM., an excellent hoist for scrap yard service or cupola charging.

ALL ABOVE IN STOCK OFFERED REBUILT & GUARANTEED.

SEND FOR OUR STOCK LIST OF A.C. & D.C. GENERAL PURPOSE, CRANES & MILL MOTORS, ELECTRIC BRAKES & CONTROL EQUIPMENT, MOTOR GENERATOR SETS, TRANSFORMERS, ETC., OF ALL SIZES.

T. B. MACCABE COMPANY
4300 CLARISSA ST.
PHILADELPHIA (40), PENNA.

FOR SALE

Tabor abrasive cut off machine. Type DAC 5 hp, 220 v, 3 ph, 60 cy. Very good condition. $500.00.

AMERICAN MARINE BRASS FOUNDRY, INC.
22 BERRIMAN ST.
BROOKLYN 8, N. Y.
PHONE APPLEGATE 7-5104

FOR SALE

One Robins portable shakeout and sand riddle, 3 ph. 60 cy. 220 v. NEW, original guarantee. Address: HILLSDALE FOUNDRY CO. INC., HILLSDALE, MICHIGAN.

FOR SALE

#40 Speedmuller with sand cooling system, motors and extra parts. Price $2500.00. Address: Box 231, The FOUNDRY, Cleveland 13, Ohio.

ROTOBLAST FOR SALE

1—No. 28, type GK rotoblast rocker barrel with a load capacity of 20 cu. ft., complete with motors, abrasive reclaimer, loader and many spare parts. This barrel was purchased new in 1942. Address: Box 269, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Practically new #3 Whiting cupola with Foxboro control less blower. Address: GREEN COLONIAL FURNACE CO., 322 S. W. THIRD ST., DES MOINES 7, IOWA.

FOR SALE

One Pittsburgh electromelt furnace, type 5, size ST, with transformer and motor generator complete. This equipment has only been in operation one year. Address: Box 243, The FOUNDRY, Cleveland 13, Ohio.

CENTRIFUGAL CASTING MACHINE

We have a senior model Kalamazoo Universal spinning machine for sale, like new, with 1½ H.P. motor and 24" head, 220/440 volt, 60 cycle current. Price $1143.67 F.O.B. our plant. Address: Box 238, The FOUNDRY, Cleveland 13, Ohio.

MOLDING MACHINE

#563-3 Osborn jolt stripper molding machine with 42" x 62" table. Completely overhauled.

NEW YORK CAR WHEEL COMPANY
15 FOREST AVE., BUFFALO 13, N. Y.

Classified Advertising

For Sale | For Sale | For Sale

LIQUIDATING!!

MODERN FOUNDRY EQUIPMENT

(NEW) 1942-1943

1—5 TON SWINDELL ELECTRIC ARC MELTING FURNACE
2—MAHR RECIRCULATING FURNACES
3—GAS MACHINERY CO., HEAT TREATING FURNACES, CAR TYPE
1—500 T. BALDWIN SOUTHWALK VER. HYDRAULIC PRESS, 4 COL.
1—2500 CU. FT. WORTHINGTON HOR. AIR COMPRESSOR, 350 HP SYN. MOTOR
1—#405 OSBORN ROLLOVER PATTERN DRAW MOLDING MACHINE
1—#561 OSBORN JOLT STRIPPER
1—#33 AMERICAN AIR FILTER ROTOCLONE
6—FOX & HAMMOND H.S. FRAME & SNAGGING GRINDERS
1—TYPE A-4 BRINELL TESTING MACHINE
1—KANE & ROACH CORE WIRE STRAIGHTENER & POWER SHEAR
1—HEBARD MODEL A-2 MULE TRACTOR GAS ENGINE
1—#92 OSBORN CORE BLOWER
1—SLY DUST FILTER & COLLECTOR, TYPE 360
1—5 TON ELECTRIC MONORAIL SYSTEM
2—2 TON CLEVELAND MONORAIL SYSTEMS
800—STERLING AND WADSWORTH STEEL FLASKS AND CORE PLATES
TYPE 57M & TYPE IP PANGBORN SANDBLAST ROOM AND ROTOBLAST CLEANING MACHINE.

Miscellaneous equipment includes:

Portable Arc Welders, Hyd. Lift Trucks, Dump Buckets, Casting Skip Carriers, 45" Elec. Lifting Magnet, Storage Tanks, Charging Buckets, cap. 80 cu. ft., (4) Whiting Crane Ladles, cap. 5 T., Preheaters, Pneu. Grinders, Chipping Hammers and Sand Rammers, Factory Flat Cars, Steel Racks . . . and many other items.

FOR COMPLETE DETAILS, SPECIFICATIONS AND INSPECTION

write — wire — phone

INDUSTRIAL PLANTS CORPORATION
90 WEST BROADWAY, NEW YORK 7

—or—

WHITEHEAD, SANGER & HOIDGE
36 WEST 40th STREET, NEW YORK 18

FOR SALE

2—International Jolt Roll-overs Type G.24 x 10	$700.00 each
1—Osborne #601 Jolt Roll-over	750.00
2—Royer portable sand blending machines 440 V., 3 phase, 60 cycle motor	200.00 each
4—International 20 x 8 Draw Type R—Hand Ram, Hand draw, hand roll-over machines	125.00 each
4—Lowe Electric Gyratory Riddles 440 V., 3 phase, 60 cycle	70.00 each
3—Ross Core drawer benches with vibrators	65.00 each
1—North American Turbo Blower 2000 cu. ft. M. 30 H.P., 3500 R.P.M., 440 V., 3 phase, 60 cycle A.C.	650.00
1—General Electric Turbo Blower 1950 cu. ft. M., 27½ H.P., 3500 R.P.M., 440 V., 3 phase, 60 cycle A.C.	750.00
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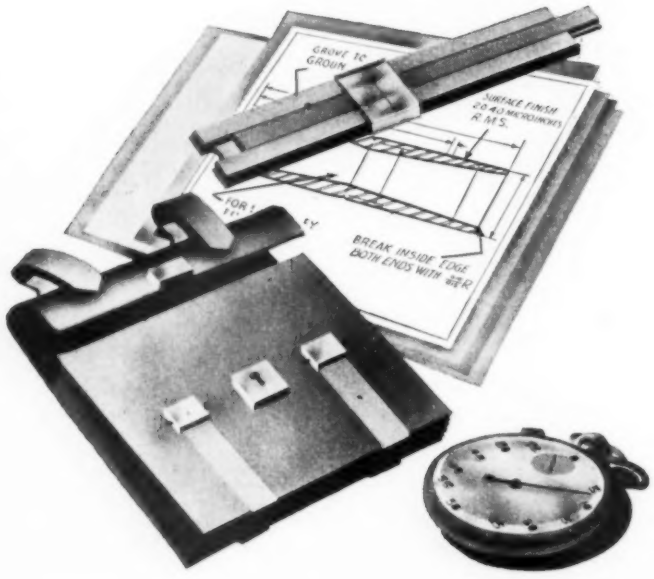

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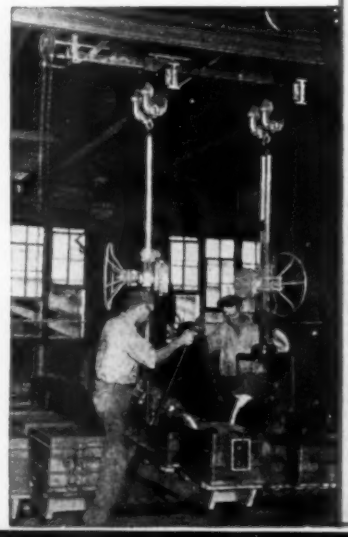

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with LINK-BELT CONVEYORS

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OVERHEAD CONVEYING. The Link-Belt overhead trolley conveyor has unlimited possibilities in handling castings, cores, and in many cases, the mold. Supported from overhead, it saves floor space, is flexible in arrangement, efficient and smooth in operation.

The transportation of materials and preparation of sand within your foundry, offers a real opportunity to lower costs. If you are still using arm and leg muscles where you should use conveyors... if you are still piling unskilled labor on top of product costs... if you still operate without the benefit of mechanical continuous-flow of materials throughout your foundry, what a revelation you will have when you sit down and talk it over with a Link-Belt materials handling and sand-preparation engineer. Link-Belt makes all types of conveyors. Call our nearest office.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

AUTOMATIC MOLD DISCHARGE. The Link-Belt Tru-Trac car type mold conveyor designed for handling both large and small snap flask molds and to operate irregular paths—up and down inclines. It has heavy cast-iron car tops, is equipped with anti-friction bearings and is low in both maintenance and H.P. requirements. The unit illustrated above, automatically discharges the molds.

MECHANIZATION PROMOTES GOOD HOUSEKEEPING. This illustration shows lines of molders at a completely Link-Belt mechanized foundry. Note the orderliness, the good illumination and the correct spacing of the molding machines in relation to the mold conveyors.

THE SYMBOL OF QUALITY LB LINK-BELT

LINK-BELT CONVEYORS

AND PREPARATION MACHINERY

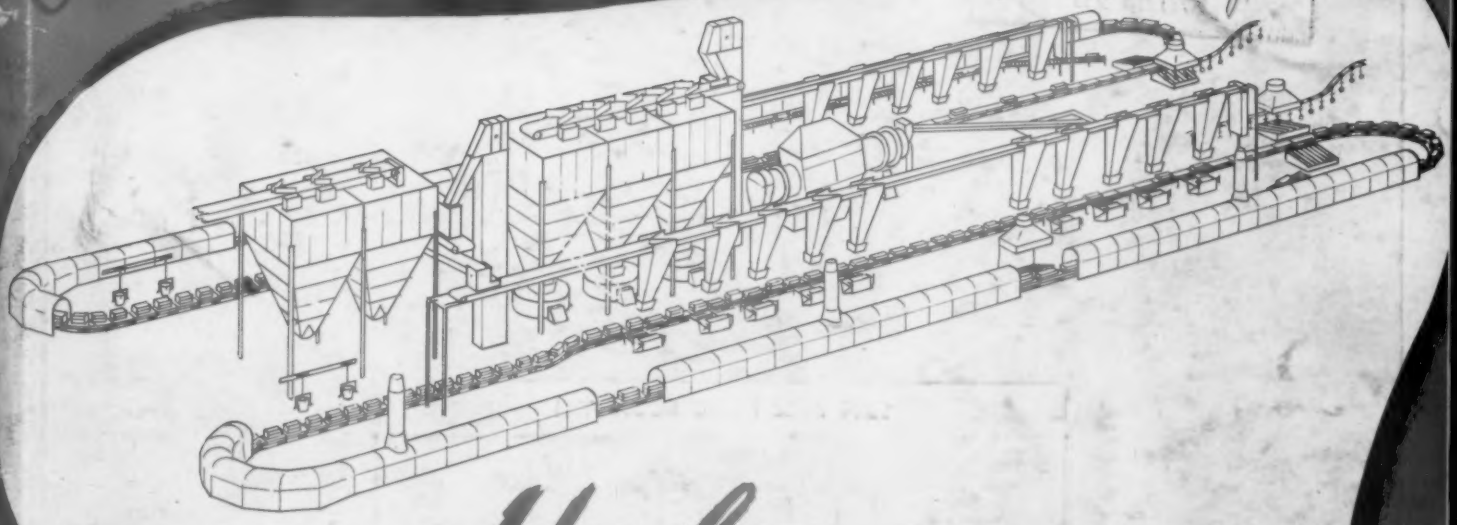
MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

THE FOUNDRY

May, 1947

wherever metals are cast...

APR 30 1947



1¼ hours

...from cupola spout to box car

● Designed in its entirety, fabricated and erected by Bartlett-Snow engineers, this recently completed installation at The Wheland Company, Chattanooga, is producing large quantities of automotive castings at very favorable "casting-to-worker" ratios.

The two loops and sand plant shown in the diagram above, are now being duplicated in the other end of the building, thus doubling production facilities. Drags and copes are made separately, on jolt, squeeze, strip machines, and the molds closed and poured on the conveyor. Copes, drags and castings are shaken out separately, and the castings are cooled and taken through cleaning to shipping, on the same overhead trolley conveyor. The sand plant, which serves both loops, features air cooled screening, triplicate storage bins and mullers, and reconditions up to 135 tons of sand per hour.

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THE C. O. BARTLETT & SNOW CO.

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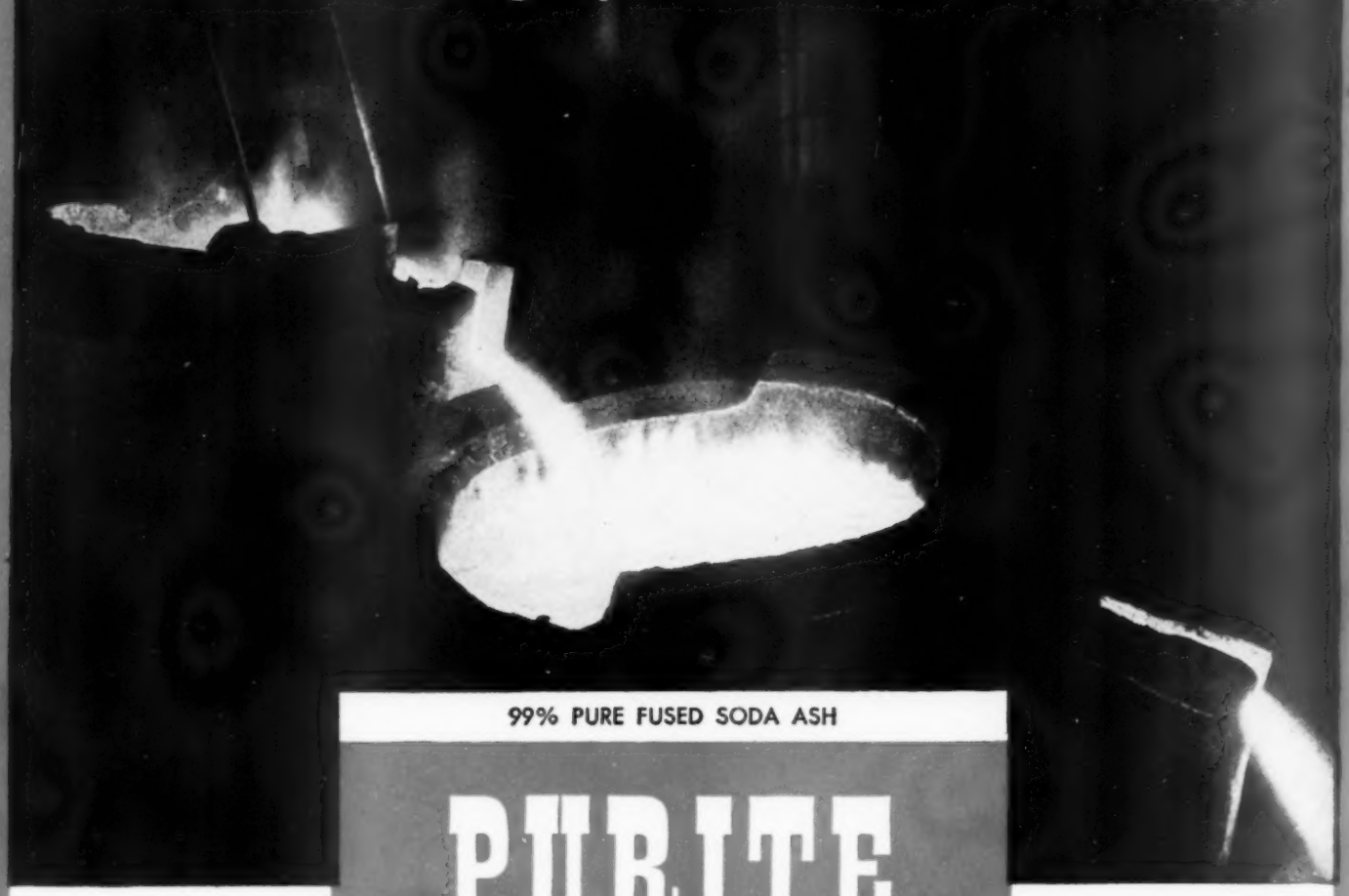

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Purite has been used for over 20 years in helping to make sounder and better castings. Can you afford to overlook this inexpensive means of improving your castings?

Our advice is always available—to help you improve your cupola practice and make better castings with Purite.

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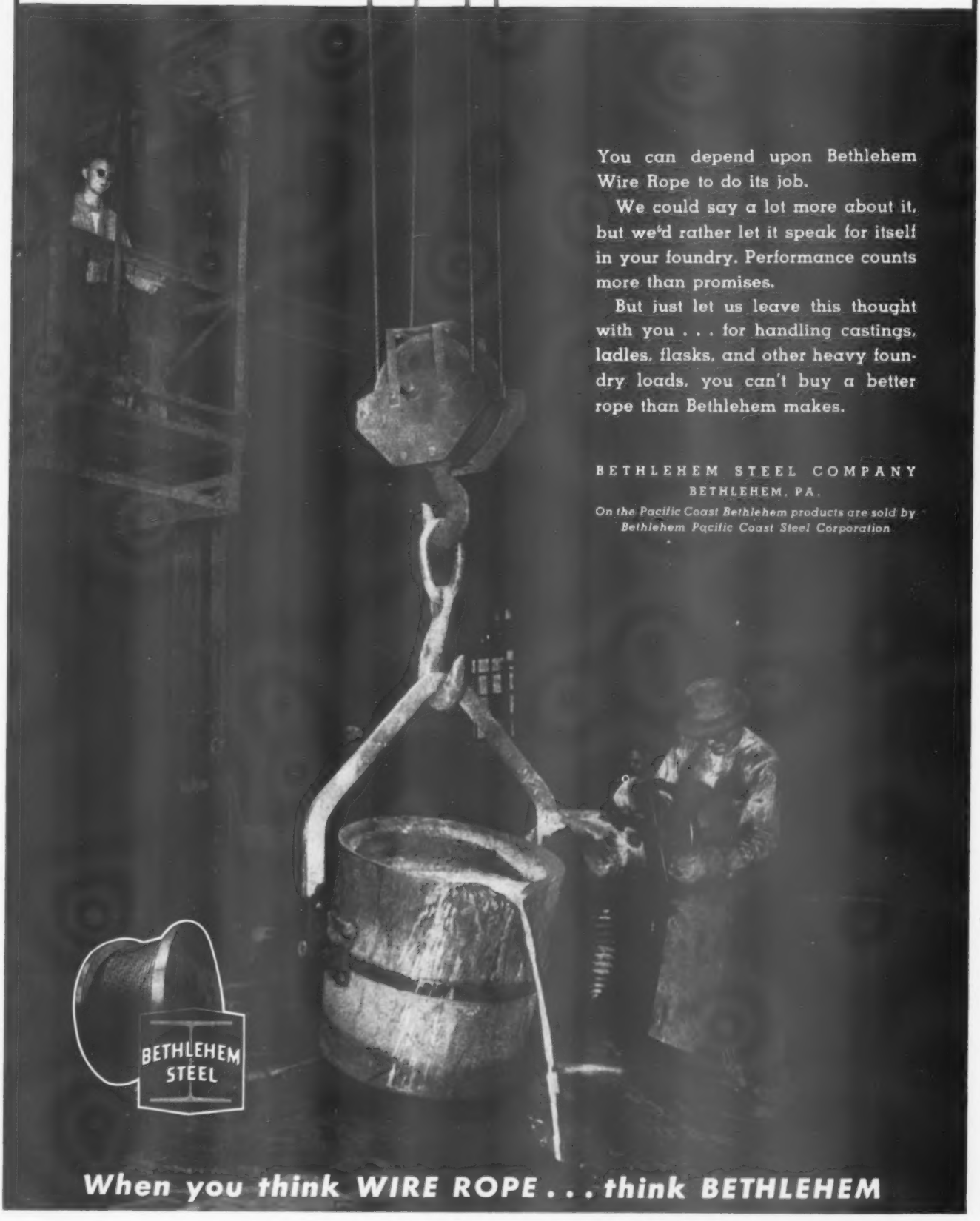
WHERE IT SPEAKS FOR ITSELF



You can depend upon Bethlehem Wire Rope to do its job.

We could say a lot more about it, but we'd rather let it speak for itself in your foundry. Performance counts more than promises.

But just let us leave this thought with you . . . for handling castings, ladles, flasks, and other heavy foundry loads, you can't buy a better rope than Bethlehem makes.

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BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

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